

# Public Finance and Budgetary Policy

BY

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## PREFACE

This book grew out of a course of lectures given originally for third-year undergraduates reading for honours in economics and, more recently, for second and third-year undergraduates reading for honours in economics or in government. It does therefore presuppose a one-year basic course in economic principles, and is intended primarily to be read as part of a general study of economics, in which Public Finance is but one component. Nevertheless, the course has been taken with considerable success by the government honours students too, who have had no other economics than the usual first year course on principles. It would therefore appear to be quite accessible to non-specialists with a serious interest in the subject but it is not a suitable text for the absolute beginner. Since all institutional material has been excluded, and the examples quoted are fairly general, a broad outline knowledge of some actual tax structure and budgetary process would be an advantage, so that the reader is in a position to cast the principles propounded here into some definite mould. Otherwise this book is intended as a self-contained introductory text on the economics of public finance and budgetary policy.

I have tried to resist the temptation to explore too many of the by-ways, rather sticking resolutely to the main highways, even though now and again I have looked over my shoulder a little fearfully at my professional colleagues as I have casually brushed aside difficulties and skated deftly (I hope) over those knotty points which are the theoretical economist's bread and butter. I have also suppressed from the text all footnotes and source references, not in any surreptitious attempt to lay claim to being the author (in any ultimate sense) of the ideas or logical systems expounded, but simply in order to allow the exposition to flow in as uncluttered a manner as possible. Indeed those well versed in this subject will recognize immediately how derivative much of the analysis is, and some acknowledgement of the debt I owe to others is indicated by the references given for further reading at the end of each chapter. These have been chosen, however, primarily with the needs of the beginner in mind, and are not necessarily original source material, for the brilliant insight, imperfectly articulated or understood no matter how important and fruitful in the development of economic doctrine, is less valuable in the introductory phase than a good survey article.

Besides the debt I owe to the many writers who have grappled successfully with the economic problems of public finance and

budgetary policy, I owe a more personal one to those of my colleagues who have grappled with earlier drafts of *Public Finance and Budgetary Policy*, and whose comments and criticisms I have tried to meet in the published version. Needless to say, the remaining blemishes are due either to my stubbornness or else my failure to appreciate what they were getting at! For allowing themselves to be exploited in this way, I am grateful to Professor Sykes, Mr H. Burton and Dr D. C. Corner at Exeter University, and to Mr Jack Wiseman at the London School of Economics. The task of revision will surely begin in earnest when this book gets its 'field trials' in the hands of a wider audience, and I would be grateful for comments and criticisms from all who read, or teach with the aid of, this text.

ALAN WILLIAMS



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## CHAPTER ONE

### Introductory

It is common knowledge that the budget is not what it used to be. It used to be simply an annual presentation to the people's representatives of the financial outcome of the Government's stewardship of the public finances during the past year, together with any changes proposed for the coming year. As such it served a similar function to the presentation of a company's accounts to a shareholders' meeting. But with the vastly expanded role of the government in the economy during this century, this earlier function of the budget has tended increasingly to be superseded by a much more general report on the state of the economy as a whole. The budget is now deliberately used as an instrument for effecting all sorts of changes in the general economic situation, and no single measure in it can be adequately analysed within the narrow framework of the budget accounts themselves. No taxes are simply to be regarded as 'for revenue', and no item of expenditure really has to be curtailed simply 'for lack of revenue'. Every tax that is levied has repercussions upon the economy which need to be investigated and appraised, and the same is true of every item of expenditure. It is to assist this process that this book has been written.

If an item of expenditure is cut it is not or ought not to be, because the money to finance it is not forthcoming. For one thing, the government is not constrained in its spending, as a private individual, by what it can earn, borrow or levy from others. The government can, if necessary, manufacture the money it needs, but even if it denied itself this liberty, its control over the banking and credit mechanisms in the economy is such that it need never be frustrated in its borrowing in the way that a potential private borrower might be. Finally, the government can almost always levy more taxes. It may not *choose* to do so, of course, if it considers that the consequences would be too harmful to the general welfare, but this is not the same as saying that the raising of more taxation is 'impossible'. It may be 'impolitic', but that is simply to say that the benefits expected from the expenditure of the revenue are not considered sufficiently great to outweigh the disadvantages entailed in raising it. The government

might then consider borrowing the money as an alternative, and again it will have to weigh the pro's and con's as before. The government therefore has a real choice as to whether or not to balance its budget, and this choice will be based (or should be based) on a cool calculation of advantage and disadvantage, and not on dogma or prejudice.

### (A) OBJECTIVES AND DISCLAIMERS

It is to aid this cool calculation, and to isolate as far as possible the dogma and the prejudice, that the analytical framework which follows has been designed. Cool calculation requires a fair amount of detachment as well as an analytical system that is precise, adaptable and comprehensive. It would be idle to pretend that these desiderata are fully met in what follows, but they do constitute a beginning. The object is not to prove any particular result, or to argue for this tax and against that, but rather to provide a conceptual framework within which everyone can think these things out for himself. The general approach is to take a particular tax (or other budgetary measure) and ask what will be its effects on various economic variables such as consumption, saving, investment, the amount of work done, and so on. Certain fundamental concepts and their inter-relationships will be described within a specified model of thought, and this will provide a hard core of rigorous analytical knowledge which must then be interpreted with care and judgment to make it relevant to any particular situation in which the reader may be interested. The analysis will itself often suggest the lines on which such further appraisal should be conducted.

The first part of this book is devoted to what has always been an important part of the traditional subject matter of public finance – the analysis of the impact of particular measures upon individual economic units (mainly households or firms) operating within an otherwise unchanged environment. The results of this partial-equilibrium micro-analysis are then taken as the starting point for a general equilibrium macro-analysis, which is conducted in the second part of the book. This macro-analysis is selective and suggestive rather than exhaustive and conclusive, and is intended mainly to show the relevance of the earlier micro-analysis to the broad budgetary problems with which most people nowadays are fairly familiar. In this way it is hoped that a more sophisticated appraisal of budgetary policy will be made possible.

Again I must disclaim any intention of attempting to support any

particular policy against any other by resort to what 'theory shows'. Indeed, I am always suspicious of partisans who attempt to bolster their positions by calling in alleged theoretical 'proofs' of what are essentially empirical matters or political judgments, just as I am suspicious of other people who dismiss unpalatable views as 'mere theorising'. Theoretical frameworks are essential to clear thought, even though they may not always be made explicit. Anyone may be led astray by adopting an inappropriate frame of reference and however logical his argument and correct his results, they will be irrelevant to his problem in consequence. But if the analysis is cool and detached, the possibility of learning from such mistakes remains, whereas the unreflecting, prejudiced partisan is likely in such circumstances either to fall back on dogma or else to become thoroughly disillusioned, neither of which responses is likely to prove conducive to learning. The political judgment, the welfare proposition, ethical, moral and religious attitudes, all have a role to play in the determination and appraisal of budgetary policy, but it will not aid cool calculation if these get inextricably bound up with the economics from the very outset. In order to isolate them, the approach adopted here is rather different from that of many textbooks in the field, for we are not concerned to explore the meaning of equity or whether there are fundamental principles of taxation or of government expenditure, but the much more pedestrian matter of what a certain measure will do, no matter what the intentions or motivation of its executors.

This means of course, that the reader will get a one-sided view of public finance and budgetary policy. No administrative difficulties deter us here, nor are the legal and constitutional constraints considered, and a ruthless circumscription of the scope of the subject (so as to exclude consideration of the national debt and of matters appertaining thereto) enables budgetary measures pure and simple to be pursued with a narrow single-mindedness that the unsympathetic will perhaps consider obsessive. It would be idle to pretend that the analysis would not have been better balanced if all these things had been taken into account, but it would not have been the *economics of public finance and budgetary policy* any more. If a work of this kind is not to embrace the whole gamut of collective human activity a line will have to be drawn somewhere, and wherever it is drawn will be arbitrary to some extent. The subject matter that has been included here has the advantage of being fairly homogeneous, susceptible to treatment by the same analytical tools, and well integrated into the general corpus of economics. It is for the reader to

complement what is presented here by similar excursions into these contiguous fields of enquiry.

## (B) THE ECONOMIC SYSTEM IN OUTLINE

Before plunging into the detailed analysis it may be helpful to have an outline sketch of the place of budgetary measures in relation to the rest of the economy. The chief source of revenue for governments is usually taxation of one kind or another. Governments often also have trading revenues from fees, etc., and the borderline between a fee and a tax is not always an easy one to establish. In general a tax is a payment which has by law to be made in certain specified circumstances and for which the government offers the particular taxpayer no specific services directly in return. In the case of taxes on personal income and wealth, and of many taxes on goods purchased by consumers, there is no difficulty, for the taxpayer becomes entitled to nothing by paying such taxes that he was not entitled to before anyway. When it comes to compulsory social security contributions the issue is rather less clear, for in such a case the payment of so many contributions is usually a factor in determining entitlement to benefit. For some licence duties it might be argued that the payment, though compulsory, is in the nature of a fee for services provided (e.g. with radio and television licences, the proceeds of which finance the broadcasting system). It is only one short further step from this to the charges levied under a postal or telephone system run as a State monopoly. Somewhere along the line the border between a tax and a fee has to be established, and although in practice the separation of taxes from commercial-type charges may be difficult in this borderline zone, in principle the broad distinction is clear enough.

Taxes may be classified in many different ways, but here we shall adopt a relatively simple division into two broad groups. The first comprises taxes that are levied directly on persons, and the second comprises the rest (called 'business taxes' for convenience). For a tax to be a direct tax on persons it has to be levied with reference to the economic status or personal circumstances of the individual taxpayer. Taxes on personal income and wealth clearly fall into this category, as would an expenditure or spending tax with which the *rate* of tax varies with the total expenditure (and personal circumstances) of the particular taxpayer. On the other hand, if the tax is on a particular kind of expenditure, and levied at the same rate no matter what the circumstances of the individual making that expenditure, then it is not a direct tax on persons, but an indirect tax,



or, in the terminology adopted here, a business tax. Other types of business tax are those which are levied on the profits of firms, turn-over taxes, and so on. What are here called 'business taxes' therefore include what are often called 'indirect' or 'outlay' taxes, and also direct taxes on firms. The reason why this particular classification is adopted is that our primary interest is in assessing *the incidence upon persons* of all taxes. for ultimately it is the welfare of persons that is the touchstone . . . the wellbeing and prosperity of firms, etc., is (or should be) only a means to this end. It is therefore convenient analytically to separate those taxes whose initial impact is upon persons from those whose initial impact falls elsewhere. We shall in fact find, in due course, that the initial impact of either type of tax is an undependable guide to its true incidence, but that is another matter.

On the other side of the Government's accounts, expenditure items will also be divided into two broad groups. First, those which are direct purchases of goods and services, and second, those which are 'transfer payments'. Transfer payments are very much like taxes in reverse from an analytical viewpoint. Like taxes, they may be direct to persons (where they constitute cash payments to individuals, based on each individual's particular circumstances) or they may be 'business transfers' (e.g. subsidies on certain transactions or to certain industries or firms). Direct governmental purchases of goods and services will not in general be further sub-divided though in some contexts it may be convenient to distinguish current from capital expenditure.

It is an important objective of this book to facilitate the appraisal of budgetary measures not within the narrow confines of the presentation or balancing of the public accounts, but within the wider context of their ramifications throughout the economy as a whole. To this end we may start with a few simple diagrams setting out the immediate and obvious links between the budget and the rest of the economy. The later analysis will then demonstrate how these initial impacts lead to all sorts of adjustments in the other relationships indicated, besides the initial change in the immediately affected money-flow. Indeed, it will be seen, in due course, that considerable structural and other repercussions may follow from budgetary measures which leave the size of the immediately affected money-flows unchanged.

The simplest outline of the economic structure is set out in figure 1.1, which is concerned with real flows of goods and services. Economic units are divided into two classes, households and firms,

ignoring, for the time being, the activities of government and links with the rest of the world. A household is a person or group of persons forming an economic unit for the purpose of organizing its consumption activities, while a firm is a person or group of persons forming an economic unit to carry on production activities. As usual, in real life it is sometimes difficult to establish a clearcut borderline between the two (the one-man business being an obvious

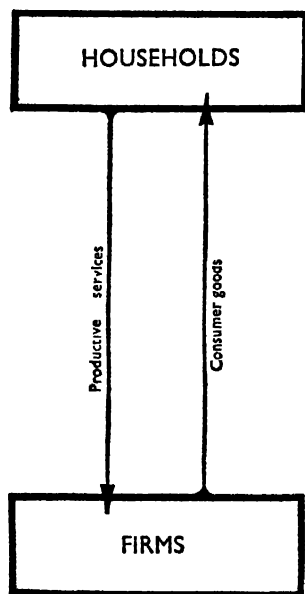


Figure 1.1

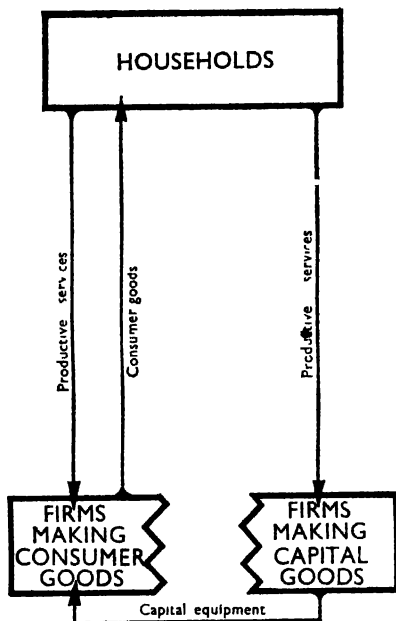


Figure 1.2

case in point), but in principle at any rate the distinction is clear. This implies that households demand consumer goods and services produced by firms, and the firms carry out their productive activities with factor services provided by households. In the process of dividing the economy into only two sectors and indicating the real flows between them, all flows within each sector disappear from view. For some purposes it therefore becomes necessary to break down these sectors into sub-sectors wherever these internal transactions are important. An example of this is given in figure 1.2, where the sector 'firms' is divided into 'firms making consumer goods' and 'firms making capital goods'. The flows between the former sub-sector and

the household sector are the same as before, but the latter sub-sector supplies its products to the other sub-sector, not to households, but it still depends on households for productive services. Of course, the supply of capital goods to firms making capital goods by other firms making capital goods is still an 'intra-sectoral' transaction and hence not shown.

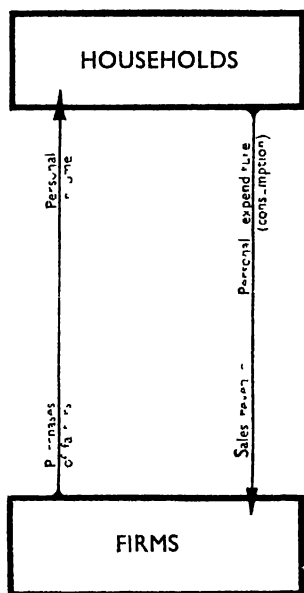


Figure 1.3

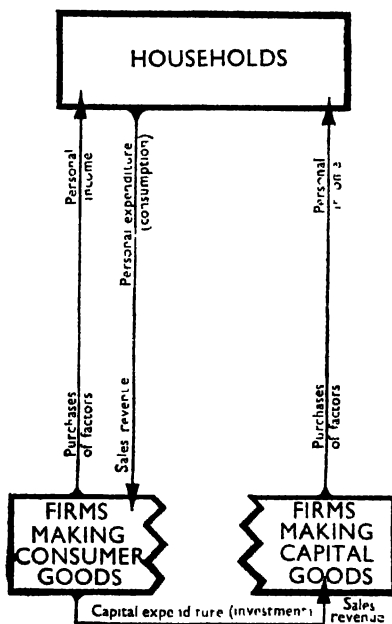


Figure 1.4

The budget does not bear directly on these real flows, however, but upon the money flows associated with them. Thus in figures 1.3 and 1.4 are set out the money flows corresponding to the real flows in figure 1.1 and 1.2 respectively. Each money flow has been given two 'labels', the first indicating how it looks to the payer, and the second indicating how it looks to the recipient. Thus the consumption expenditure of households is the sales revenue of the firms making consumer goods, and so on. It is in terms of these money flows that the economy is usually described, and through which it is usually manipulated. This should not be allowed to obscure the fact that it is the more fundamental real flows which are ultimately the more im-

portant, and it is to help discover the effects of budgetary measures upon these that is the purpose of the later analysis. The more immediate objective, however, is simply to establish the link between the budget and these various money flows.

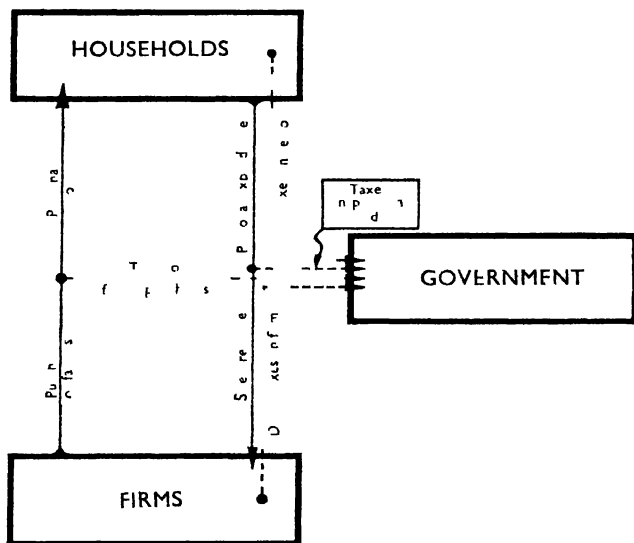
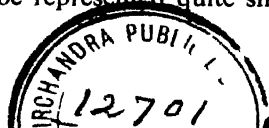


Figure 1.5

This is done for taxation in figure 1.5. Direct taxes on persons are shown as a flow emanating from within the household sector itself, and ending up in the government sector. Direct taxes on firms are shown in an analogous manner. These taxes, though levied on a tax base which has personal income or business profit as its major component, also take into account the circumstances of the particular person or firm, so that these taxes cannot be considered simply as taxes on the money flows entitled 'personal income' or (still less) 'sales revenue' respectively. On the other hand, those taxes which fall on certain items of consumption expenditure irrespective of the particular circumstances of the purchaser are shown as emanating from the flow of personal expenditure itself, and similarly with taxes on factor purchases by firms (e.g. a payroll tax).

Turning to governmental expenditure, it will be seen that the transfer payments can be represented quite simply as were the tax



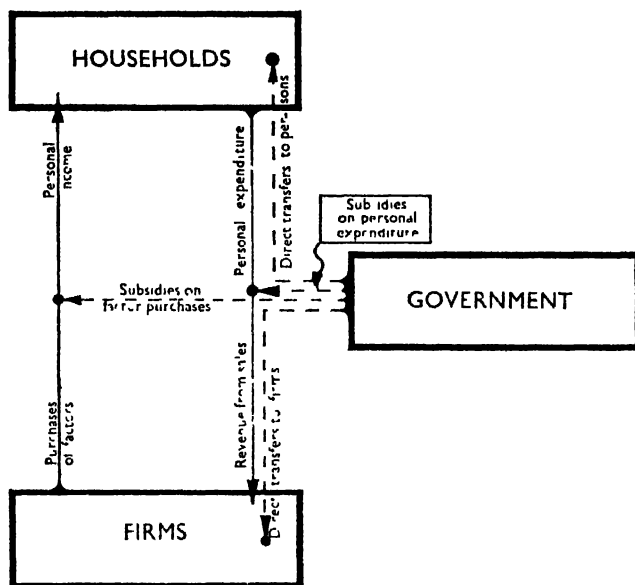


Figure 1.6

flows, but reversing the direction of flow, and they are shown in this way in figure 1.6. Where the Government purchases goods and services from firms, and productive services from the household sector, its activities are on a par with the corresponding flows between households and firms themselves, as shown in figure 1.7. It will be noted here that there are no money flows associated directly with the provision of goods and services by the Government for the private sector. This is because it is of the essence of Governmental services that they are not bought and sold on the market as are other goods and services. Where the Government operates any services basically on commercial lines (e.g. through State ownership of certain industries), then such activities are considered to be part of the sector 'firms'. If in some particular situation it is important to distinguish the State-controlled sector of industry from the private sector, then the 'firms' sector could be split accordingly (as with figures 1.2 and 1.4 earlier). But since the activities of Government owned or controlled firms do not normally play a significant role in budgetary policy as such, they will not be treated separately here.

Finally we must consider the money-flow relationships between this economy and other economies. All other economies will be lumped together into a single sector called 'The Rest of the World'.

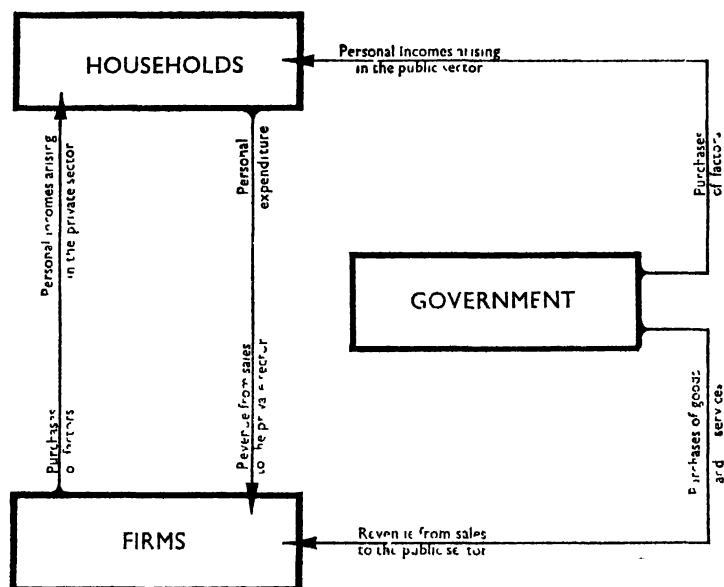


Figure 1.7

and they will be considered to have two-way relationships both with Households (in the form of remittances) and Firms (Imports and Exports). As indicated in figure 1.8 the Government may tax any of these four flows, and may even levy direct taxes on economic units abroad (e.g. its own citizens temporarily resident elsewhere). Figure 1.9 shows the subsidies and transfers corresponding to these taxes, and also purchases of goods and services which the Government may itself make abroad. In both these diagrams the Government's domestic transactions have been omitted for greater clarity.

To gain a complete picture of all these various budgetary measures, we have only to fuse together figures 1.5, 1.6, 1.7, 1.8 and 1.9, and the result is figure 1.10. For convenience, subsidies and transfers have been channeled through the same flows as the taxes to which they correspond instead of constructing a separate set of flows from the expenditure side of the Government sector (otherwise their position here would have been as indicated by the stubby lines marked '(Transfers and subsidies)'). In practice many of these flows will be negligible in amount or even non-existent, however, so that for most economies a simplified flow chart, such as that given in figure 1.11, would include all the significant transactions that occur.

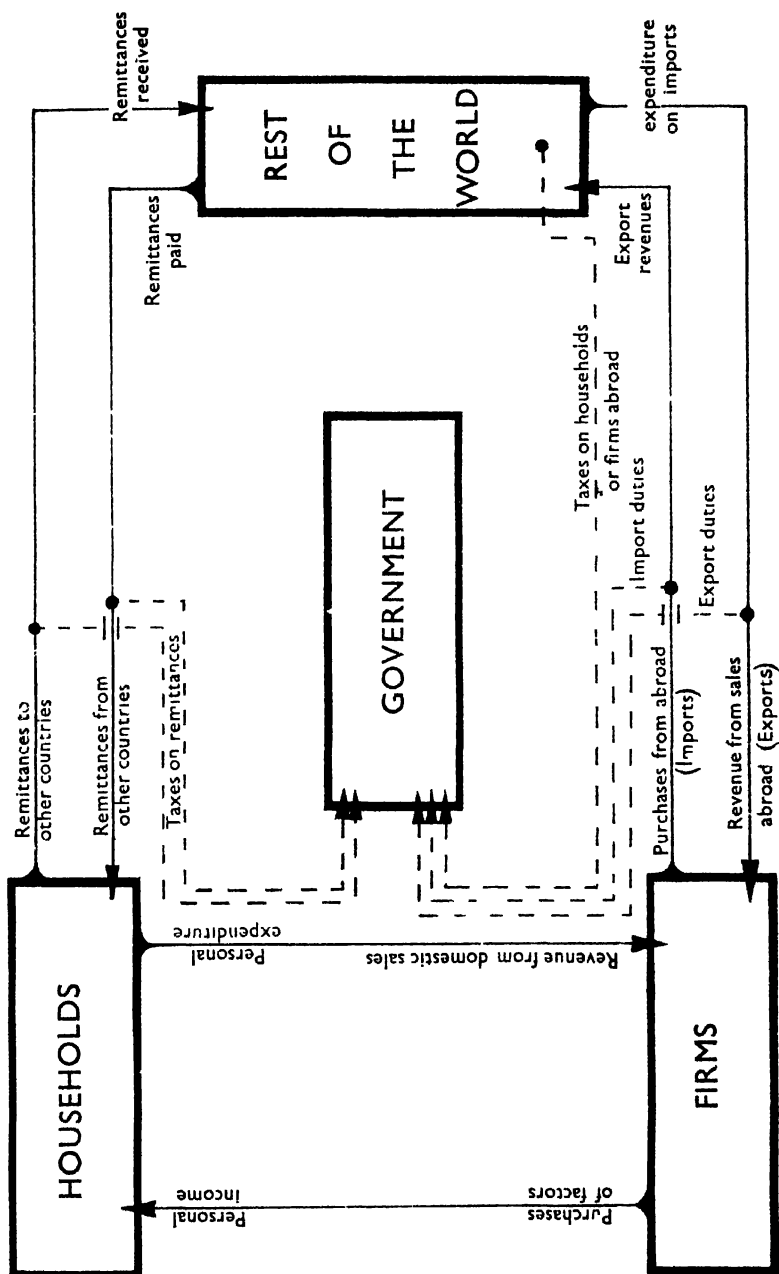


Figure 1.8

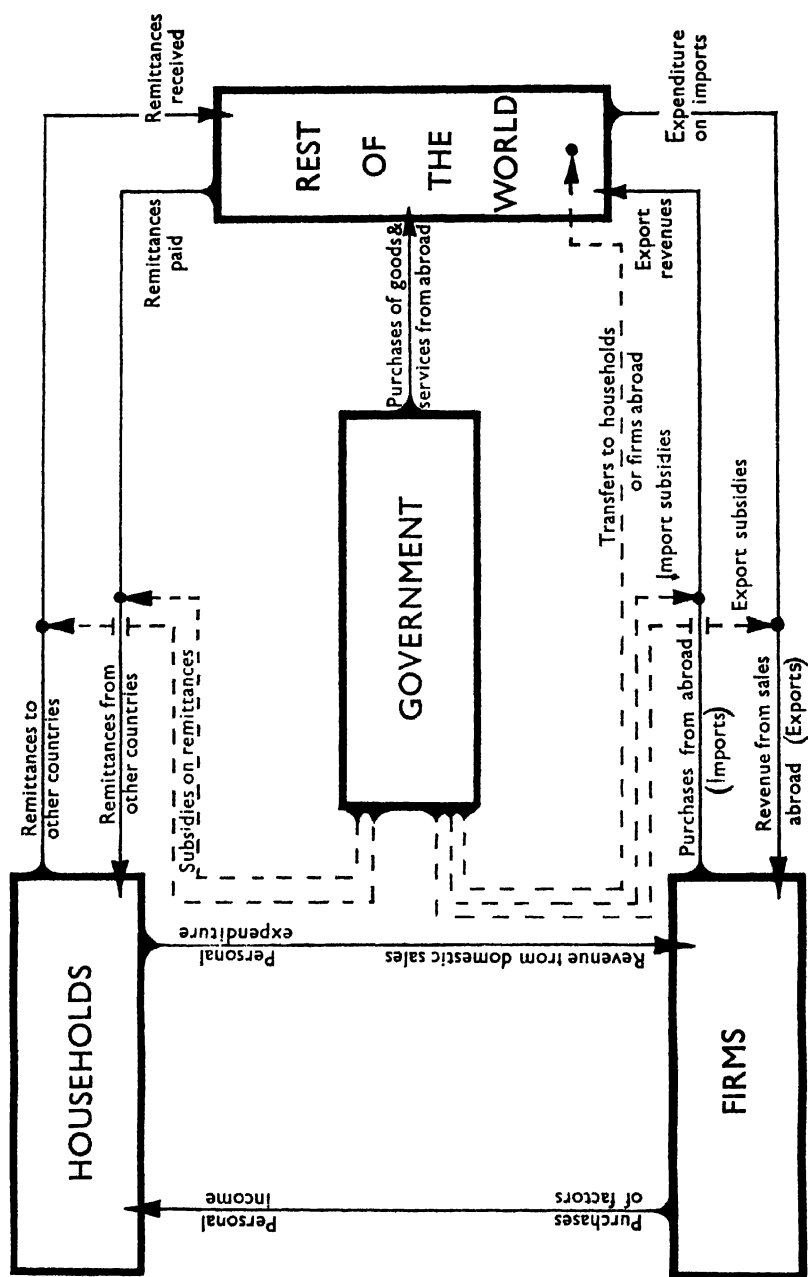


Figure 1.9



Figure 1.10

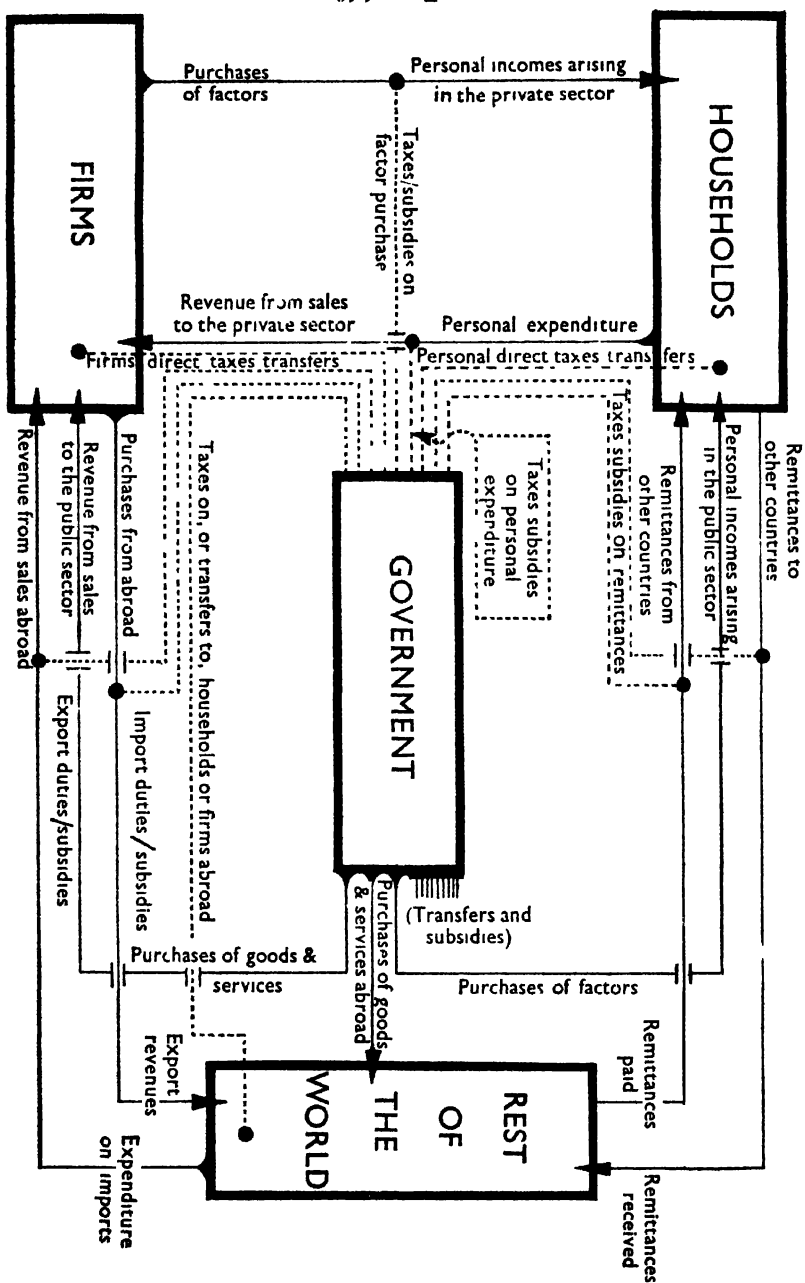
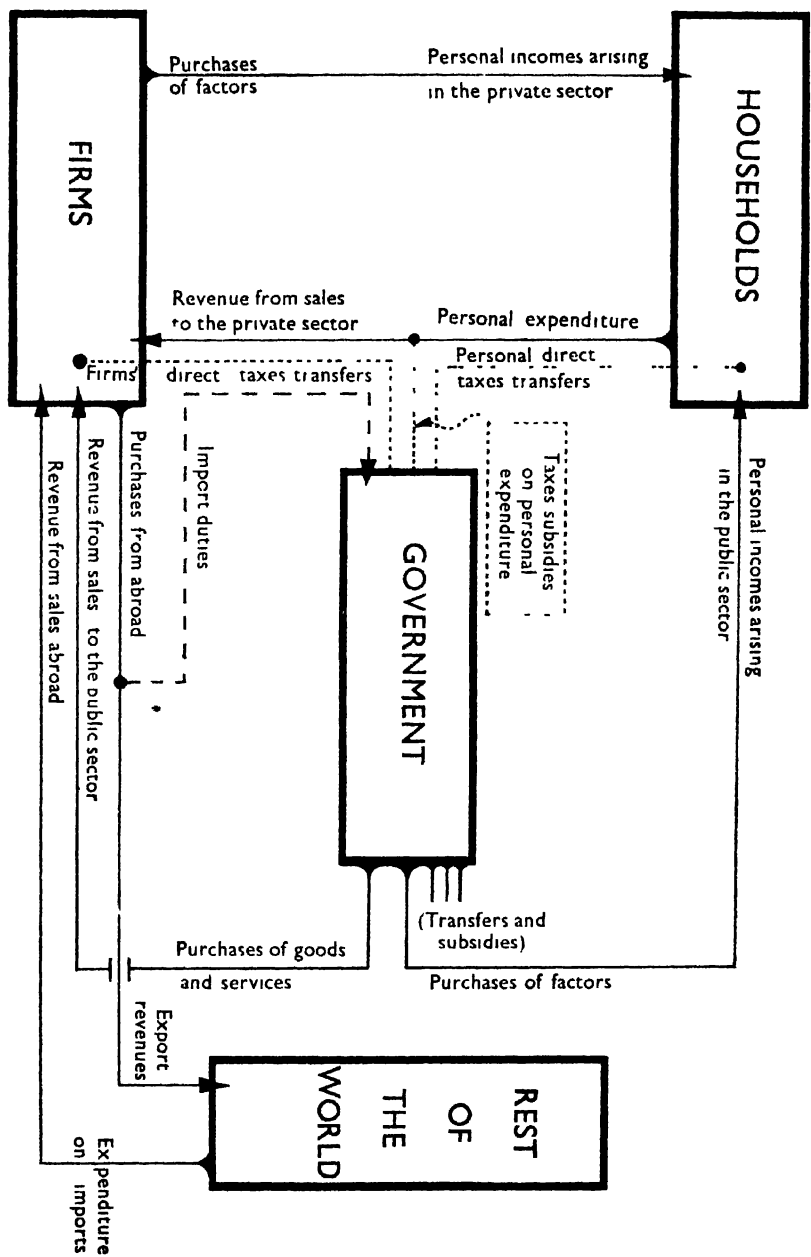


Figure 1.11



**(C) PLAN**

In the following chapters the analysis is divided into two parts—Part A consisting of micro-economics (i.e. the impact of particular budgetary measures upon a particular household or firm, assuming that no other changes occur) and Part B consisting of macro-economics (i.e. an examination of the repercussions of these individual reactions upon the flows set out in the preceding diagrams and upon the structure of the sectors themselves). In Part A the various taxes and items of Government expenditure set out in figure 1.11 are taken up and analysed in turn, while in part B the results so obtained are related to the broad objectives of budgetary policy. A concluding chapter draws the threads of the argument together.



## PART A

### Micro-economics

---

There are many different types of analytical framework within which a problem may be tackled, and each is likely to produce a different answer. As an example let us take the question 'is commodity taxation inflationary?' First of all the terms 'commodity taxation' and 'inflationary' need to be defined carefully. Commodity taxes are taxes levied on goods and services when produced or sold, and may be at a certain sum per unit, or at a stated proportion of cost or price. 'Inflationary' may mean 'tending to make aggregate demand exceed aggregate supply' or 'tending to make the general level of prices rise', or it may be that the tax has not merely to have this 'tendency' but must actually produce such a result. Thus we must either choose one or other of these interpretations, or else be prepared to work with each one in turn in every situation. Similarly we need to specify exactly what commodity tax or taxes we are considering, how levied, on what goods or services, at what rate, etc.

Having thus reformulated the question more precisely, we would then have to consider the circumstances in which the tax is levied. First of all this would involve us in considering the reactions of one particular taxpayer, which would entail examining his economic environment, specifying those elements in it over which he has some control and those over which he has none, and then going on to examine his motivation, and so on. We could then build up a picture of his reactions, among which might be, in certain circumstances, raising the price of the taxed goods to the people to whom he sells it. This then gives us one kind of answer to the question we have posed. But other individuals in similar objective circumstances might well react quite differently (because their motivation, or knowledge, or expectations, are not the same). This would lead us to a more qualified answer, along the lines 'some will and some will not'. Then we could go a stage further and find out whether any given individual reacts differently if his objective circumstances are varied in this respect or that, and this could be repeated for other individuals too, and as we go on the answers we get are likely to become less and less clearcut.

But in all this we have considered an individual reacting in a fairly set environment. This may be a valid representation of how things look to the individual himself, but it is not very sensible if we are concerned to analyse the general economic repercussions of a tax. Taxes affect large groups of people simultaneously, so that as they react in their several ways, these reactions are likely to produce significant shifts in the environment itself, and as a direct result of their reactions. Each by himself is insignificant, but together the effect is (or may be) quite substantial. Thus if the predominating reaction to the commodity tax is for sellers to raise prices to purchasers, this will lead purchasers to adjust their consumption pattern and possibly also their saving pattern, which in turn will change relative demands, prices, the composition of output, relative factor prices, personal incomes, and hence consumption and saving patterns again, and so on. By the time all these repercussions have worked themselves out we will probably find that every individual's economic environment will have been changed, though for many the change may be negligible. But substantial changes may well occur for people not initially or directly affected by the commodity tax in question, while others on whom it had a primary impact are much less affected. In this way the kind of answer we reached earlier may have to be greatly modified in the light of the results obtained in this wider context. Moreover, all sorts of further complications will intrude about which some assumptions or other will have to be made (e.g. what kind of monetary policy the Government is pursuing, on what do wage levels depend, the relationships of the economy to other economies, and so on).

This broad frame of reference is not a suitable *starting* point for our analysis, but we shall begin to tackle it in Part B. Part A is concerned only with the narrower frame of reference outlined above, in which the individual's reactions are examined within a fairly rigid environment. Households and firms will be assumed (a) not to expect their actions to have any further effects upon their environment, and (b) to make their choices without being influenced consciously by the choices of others (i.e. there is no 'expectational' or 'speculative' element in their decisions). The resulting partial equilibrium micro-analysis will yield results that are correspondingly limited in their validity, but they constitute an important first stage in obtaining a more general picture of the effects of budgetary policy.

One such limitation, which must be emphasized at the outset when it comes to interpreting our findings, concerns the meaning to be attached to phrases like 'better off' and 'worse off', to statements

that one situation is 'preferred' to another, and to the concept of 'welfare' generally. Since the individual is here being presented with a carefully circumscribed field of choice in each situation that we consider, it must be clearly understood that to say he is 'better off' (or that his welfare is greater, or that he will prefer to be) in one position rather than another, refers only to his assessment of those particular outcomes open to him at the time, and only in the respects in which choice was permitted. Nothing more general than this is implied by the use of these terms.

## CHAPTER TWO

### Lump-sum Taxes on Persons

The questions that have to be answered about direct taxes on persons concern their *formal incidence*, i.e. on whom are they actually levied, their *effects on the behaviour of the taxpayer*, i.e. how is his spending, saving and working affected, and finally the effects of these various reactions upon the economy generally. Since we are here only concerned with micro-economics, the last group of questions will be left until later (see Part B).

We can begin our analysis by considering the simplest personal direct tax, the lump-sum *per capita* tax. This may be levied at the same fixed rate on all electors (the 'poll' tax) or it may assume a more complicated form (as with the flat-rate contributions paid compulsorily by each class of insured person under the British National Insurance Scheme). The essence of a lump-sum tax is that the amount payable shall not vary in response to any reactions that the taxpayer may exhibit. Thus, it must not depend on how much he earns, or spends, or saves, etc. Any variations there may be in the rates of tax payable by different persons must depend on other criteria, such as age, sex, etc. However, as we shall see later, many taxes which are not thoroughgoing lump-sum taxes, may conveniently be treated as lump-sum taxes *in certain respects*. Thus taxes which depend on marital status, type of employment, or place of residence, may in some circumstances be considered lump-sum taxes, even though it is within the powers of the taxpayer to change the way he is classified for liability to tax. In an ultimate sense there can be no tax which is strictly 'lump-sum' in all respects, for a poll tax can be avoided by dis-franchising oneself, a compulsory national insurance contribution by emigrating, etc. It is really just a matter of degree, so that the drawing of any particular distinction of this sort will be a matter of judgment in the context in which it is to be used.

However, just because a tax is so levied that the amount of tax payable does not vary with variations in spending, saving or working, does not mean that it will not affect these things. Clearly such a tax reduces disposable income, and this must affect either spending or saving, and probably both. It may also affect the earning of income



by the supply of effort as well as from savings. These various possibilities we will now analyse with the help of some simple geometrical devices that will form the basis of the analytical technique to be employed throughout this part of the book.

### (A) EFFECTS ON THE PATTERN OF SPENDING

First let us consider the effects of the lump-sum tax on the pattern of spending, assuming, initially and for the sake of simplicity, that the tax is met purely at the expense of spending (i.e. income before tax, and saving, are left unchanged). To keep the analysis manageable,

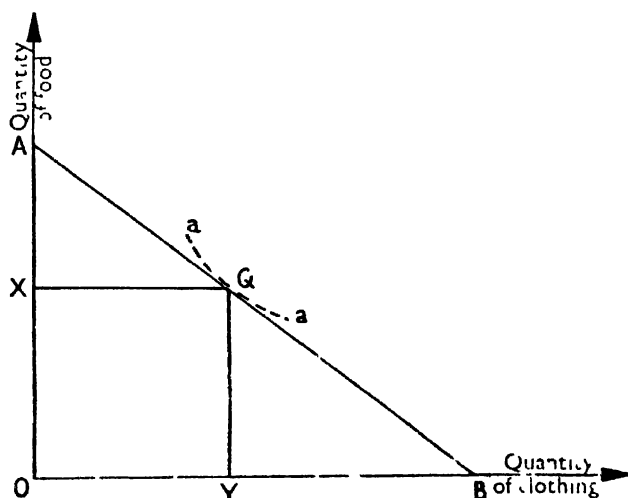


Figure 2.1

let us suppose that our consumer buys only food and clothing, and that, given the prices of these commodities, if the whole of his spendable income before tax had been spent on food, he would have been able to buy the quantity  $OA$  in figure 2.1, whereas if it had all been spent on clothing he could have bought the quantity  $OB$ . Since he can also buy a whole range of intermediate combinations of food and clothing with this same amount of money, his consumption possibilities are indicated by the line  $AB$  in figure 2.1. We will assume that the combination he prefers to all the others on  $AB$  is  $Q$

(where  $AB$  is tangential to the indifference curve  $aa$ ) so that he buys  $OX$  of food and  $OY$  of clothing.

When the lump-sum tax is imposed, we are assuming that he cuts his spending by the same amount. Thus in figure 2.2 the consumption possibility line is shifted from  $AB$  to  $CD$ .  $CD$  will be nearer the origin  $O$  than  $AB$  by whatever proportion the tax bears to total expenditure

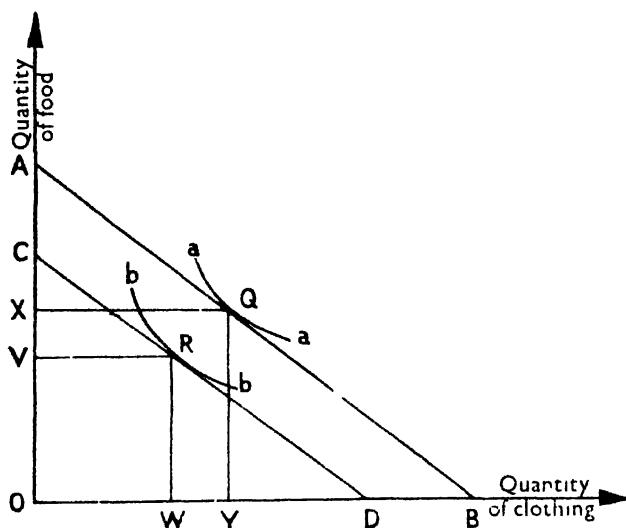


Figure 2.2

when there was no tax. Thus  $AC$  (the reduction in the maximum amount of food that can be bought) will bear the same relationship to  $OA$  as  $BD$  (the reduction in the maximum amount of clothing that can be bought) does to  $OB$ . Obviously, then,  $CD$  will be parallel to  $AB$ .

But there is no reason to suppose that the preferred pattern of spending in this new situation will simply be an equi-proportional reduction in the amounts of food and clothing purchased in the original preferred combination. Since the general level of consumption will have fallen, it may well be that more severe cuts are made in some items than in others, and in figure 2.2 the indicated new choice,  $R$ , illustrates a case in which a more substantial cut has been made in clothing than in food.

## (B) EFFECTS ON SPENDING vs. SAVING

Next we can turn to the effects of the lump-sum tax upon the decision whether to spend or save, without considering at this stage the actual patterns of spending or saving, and excluding changes in income before tax.

Here we need a simple framework within which we can consider what happens to spending saving decisions through time, since saving is essentially the setting aside of resources now for use later. In order not to introduce unnecessary complications, let us assume that the individual makes such decisions only over a two-period time-span. These periods could be 'this week' and 'next week', or 'this year' and 'next year', or 'working life' and 'retirement', or what you will. In order to maintain the greatest possible generality they will simply be labelled 'this period' and 'next period'. The situation confronting the individual can then be plotted as in figure 2.3.  $OY_1$  is his expected

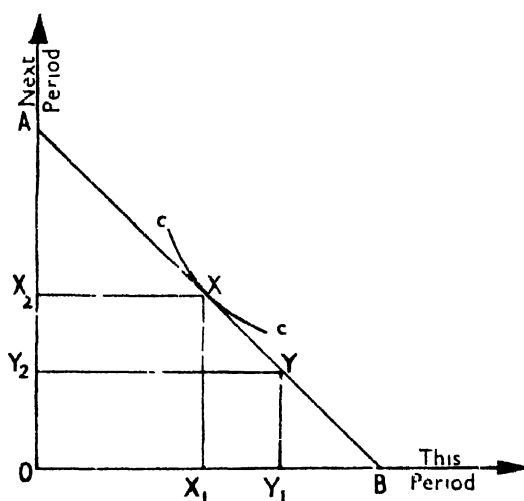


Figure 2.3

income this period, and  $OY_2$  his expected income next period, so that the combination is given by the point Y. If our individual could borrow against future income without payment of interest, and save this period's income for use next period without cost or reward, then he could use his total income  $Y$  in any way he liked over the two periods. His possibility line is therefore  $AB$ , a line drawn

through the point  $Y$  at  $45^\circ$  to each axis. Thus  $OB$  represents the maximum consumption possible this period (leaving nothing for next) and  $OA$  the converse. It will also be obvious that the distance  $Y_1B = OY_2$ , and  $Y_2A = OY_1$ . It will be assumed that individuals save (and borrow) only for their own consumption, and that all the income available in the two periods is consumed in the two periods (the case where people also save to make bequests is treated in Chapter V). He will have some preferred pattern of consumption over the two periods, and in figure 2.3 the case is illustrated where he chooses the combination  $X$  on  $AB$  (where it is tangential to the indifference curve  $cc$ ) so that he spends  $OX_1$  and saves  $X_1Y_1$  of this period's income, and in the next period spends on consumption not only the income of that period ( $OY_2$ ) but also the money saved ( $Y_2X_2 - X_1Y_1$ ) from the previous period. In this way the time-pattern of his consumption and the time-pattern of his income ac-

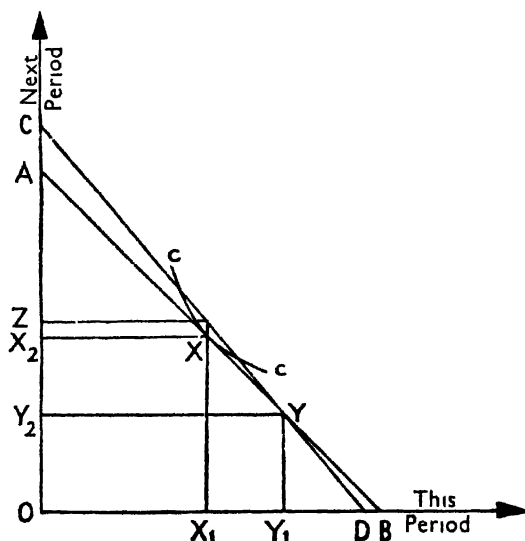


Figure 2.4

crual are made to diverge so as to bring about a preferred distribution for the former. Note that if the points  $X$  and  $Y$  were reversed in figure 2.3, the individual would have borrowed  $X_1Y_1$  and repaid it in the next period. Thus whether individuals are borrowers or lenders depends upon their consumption preferences relative to their income accruals through time.

So far we have been assuming that no interest payments or receipts are involved in these saving-dissaving or borrowing-repaying operations. This limitation can now be relaxed. If saving has occurred, then when dissaving takes place, a sum greater than the original sum saved can be spent. Thus, in figure 2.4, instead of only  $Y_2X_2$  being available for consumption next period for an initial saving of that same amount, the total receipt will be  $Y_2Z$ , where  $X_2Z$  is the interest

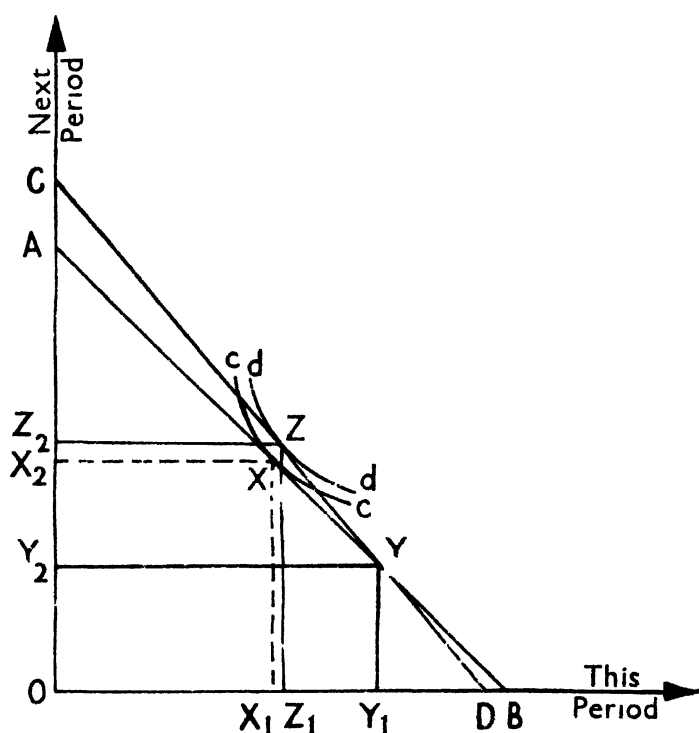


Figure 2.4

receipt. Obviously, the more is saved, the greater will be the interest received, and, conversely, the more that is borrowed, the greater will be the interest payment. The possibility line, taking account of interest, will therefore be  $CD$  in figure 2.4, which coincides with  $AB$  at  $Y$  (since no borrowing or lending occurs there) but diverges from it steadily the further the individual moves from  $Y$  (i.e. the more he

saves or borrows). The angular difference between  $AB$  and  $CD$  will be greater the higher is the rate of interest.

Our individual will now have to make his choice from among the consumption possibilities indicated by  $CD$ , and on figure 2.5 it has been assumed that he would choose the combination  $Z$ , which means that although he reduces his savings, by comparison with the no-interest situation, from  $X_1Y_1$  to  $Z_1Y_1$ , he is nevertheless able to increase this consumption in both periods over and above what it was in the previous situation, due, of course, to the interest-receipt. It would, of course, be equally easy to construct examples where saving increased or remained the same, and to do the same for the opposite case where the individual is a borrower. It should be noted too that if the individual chooses to be at  $Y$  in the no-interest case, he will become a saver if interest is introduced, but other than this, nothing definite can be said *a priori*.

Now what would be the effect of a lump-sum tax on all this?

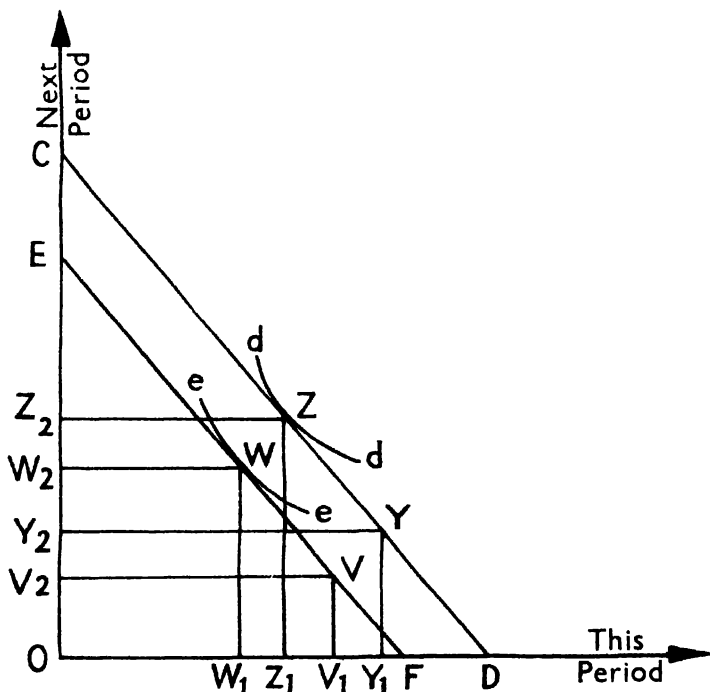


Figure 2.6

Assuming that it is levied at the same amount in both periods, then it will shift  $Y$  to some such position as  $V$  in figure 2.6, where  $V_1Y_1$  (the amount of tax paid in this period) is equal to  $V_2Y_2$  (the amount of tax payable next period). The tax will not however affect the rate of interest payable or receivable, so that the new opportunity line,  $EF$ , through  $V$ , will be parallel to the old one,  $CD$ , through  $Y$ . It will now be one of the combinations of present and future consumption on  $EF$  that the individual will select, and in figure 2.6, it is assumed that the point chosen is  $W$ , so that consumption is reduced in each period. In general, the individual might reduce or increase the amount of saving he does, but figure 2.6 illustrates the special case where the amount of saving in fact remains unchanged ( $W_1V_1 = Z_1Y_1$ ).

### (C) EFFECTS ON THE PATTERN OF SAVING

If the volume of saving is changed by the imposition of the lump-sum tax, the pattern of saving may also be changed. By the 'pattern' of saving is meant the form in which savings are held, i.e. their distribution between cash, deposit accounts at banks, Government securities, shares in public companies, etc. This choice normally involves weighing higher yields against increased risk, for usually a higher return on savings can only be anticipated if a greater risk of loss is assumed. A simple way of analysing the effect of a changed

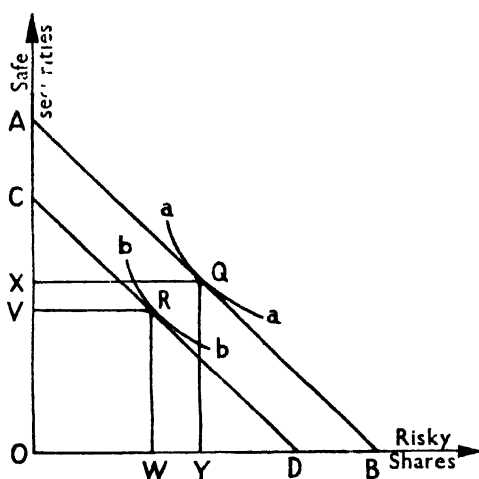


Figure 2.7

volume of saving upon the nature of the saving 'portfolio' is indicated in figure 2.7, which is analogous to the earlier analysis of the pattern of consumption in figure 2.2. Here it is assumed that the given amount of saving can be distributed between two kinds of asset, 'safe securities' and 'risky shares', with the possible combinations available given by the opportunity line  $AB$ . It is assumed that the preferred portfolio is  $Q$  before any tax is imposed. The lump-sum tax then shifts the opportunity line by the amount by which the volume of saving is reduced, say to  $CD$ , and a new choice is made from the combinations now available. In figure 2.7 it has been assumed that the individual 'plays safe' when the volume of saving is reduced, and cuts down on investment in 'risky shares' by more ( $WY$ ) than he cuts the 'safe securities' ( $VX$ ). It is, of course, equally plausible, *a priori*, to construct cases where the individual's reaction is to take greater risks when the volume of saving is cut. Moreover, it should be remembered that, as we saw in the preceding section, the imposition of the lump-sum tax may leave the volume of saving unchanged, or even increase it. In the latter case we can throw the analysis of this section into reverse, while in the former case it becomes irrelevant.

If portfolio shifts do occur when the volume of saving changes, then we can no longer assume, as we did in the preceding section, that the rate of interest received or payable remains constant whatever the volume of saving or borrowing that is taking place. This means that  $CD$  in figures 2.4, 2.5, and 2.6, and  $EF$  in 2.6, will no longer be straight lines, but will have to be redrawn to indicate the actual returns and payments as the pattern of saving and borrowing changes. But this redrawing of the lines through  $Y$  as curves through  $Y$  does not materially affect our earlier conclusions.

But there will also be an effect upon the pattern of saving *even if the volume of saving remains unchanged*, as it did in the case analysed in figure 2.6. This is because the tax may change the 'riskiness' of a share, and therefore upset the basis of classification used in the preceding discussion. This can be seen if we approach the matter from a somewhat different angle. Let us assume the volume of saving to be unaffected by the tax, and consider only the various yield/risk combinations exhibited by the different assets available. Individuals are assumed to desire high yield and to dislike risk, but since the two tend to vary together, this poses a difficult problem of choice for them.

To keep the analysis fairly simple, let us take 'yield' to mean the mathematical expectation of yield, and risk to mean the mathe-



mathematical expectation of loss. (Thus if a particular asset carries with it a 10 per cent chance of gaining £100, plus a 60 per cent chance of gaining £10, plus a 30 per cent chance of losing £10, the mathematical expectation of yield is one-tenth of £100 (£10) plus three-fifths of £10 (£6) minus three-tenths of £10 (£3), i.e.  $£(10 + 6 - 3) = £13$ . The mathematical expectation of loss pays attention only to the negative items, and is therefore £3.) These combinations could then be plotted on a diagram, as in figure 2.8, where it is assumed that infinitesimal gradations are possible in the combinations available, so that a possibility line such as  $OA$  could be constructed. There will of course be possibilities to the left of  $OA$ , but they will not be chosen since they involve more risk for the same yield, or less yield for the same risk, as combinations on  $OA$ . Arithmetic details of the points I to IV are given in the table on page 43. It has been assumed that each successive increase in yield requires the bearing of more risk than the one before, and that the no-risk no-yield alternative (i.e. the point  $O$ ) is also available.

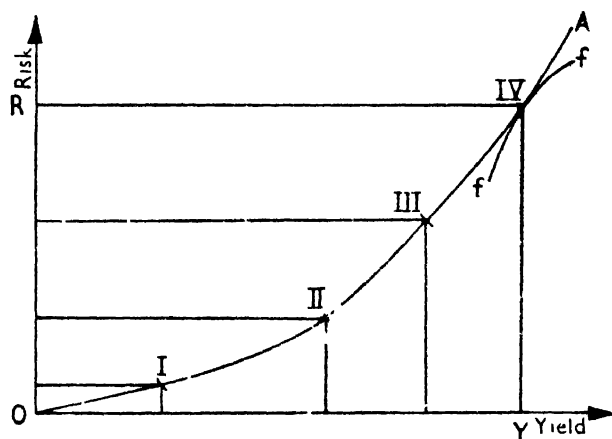


Figure 2.8

The individual has now to choose one of the combinations of risk and yield indicated by  $OA$  in figure 2.8. Since he likes yield and dislikes risk, he will be better off the further he is to the right, and the lower down he is, and his indifference curves will have the general properties exhibited by the curve  $f$ , which is in fact the one assumed to be tangential to  $OA$ , and therefore indicating that the point

IV represents the preferred yield-risk combination in the absence of any taxes.

If a lump-sum tax is now imposed, it will simply reduce all the possible outcomes associated with each asset by the amount of the tax. The precise effect on the mathematically expected loss depends on the overall probability of any loss at all occurring, but the general effect will certainly be to increase these expected losses. (See the arithmetic details of points I to IV in the table on the following page.) In terms of the diagram, this means that  $OA$  will be shifted to the left (to the extent that yields are reduced) and upwards (to the extent that risk is increased), so that the post-tax possibility line may look like  $BC$  in figure 2.9. Note that the no-risk no-yield option is no longer available. We have assumed that the chosen combination on  $BC$  will be V (where  $BC$  is tangential to the indifference curve  $gg$ ), indicating that more risk is assumed ( $OS$  instead of  $OR$ ) but in spite of this the expected net yield (after tax) is reduced (from  $OY$  to  $OZ$ ).

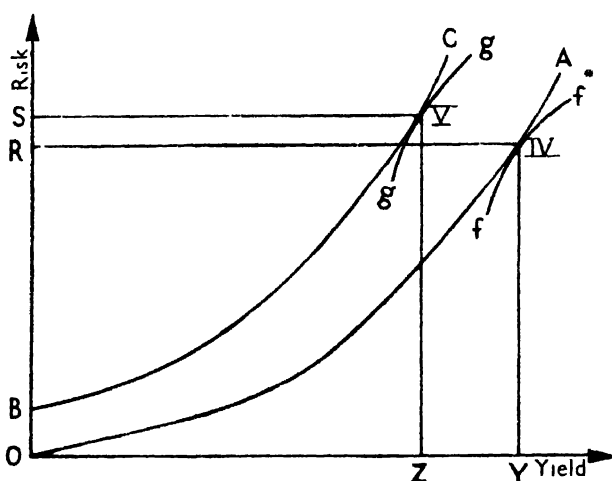


Figure 2.9

As was pointed out earlier, this effect is different from that associated with a change in the volume of savings as analysed in figure 2.7. What is implied in terms of that figure is a change in the nature of the 'risky share', and hence a change in the individual's attitude to it, represented graphically by a shift in the whole preference structure as set out by his indifference curves. The lump-sum tax

## EFFECTS OF A LUMP-SUM TAX UPON YIELD AND RISK

Quantitative detail of the points I to IV in Figure 2.8

POINT	I	II	III	IV
WITH NO TAX	<p>10% chance of £100 is £10 60% 10 6 30% -10 -3</p> <p>Making a net yield of £13 and a loss of £3</p>	<p>50% chance of £80 is £40 40% 0 0 10% 100 -10</p> <p>Making a net yield of £30 and a loss of £10</p>	<p>25% chance of £160 is £40 25% 80 20 25% 20 5 25% 60 15</p> <p>Making a net yield of £40 and a loss of £20</p>	<p>50% chance of £102½ is £82 20% -160 -32</p> <p>Making a net yield of £50 and a loss of £32</p>
WITH LUMP- SUM- TAX OF £10	<p>10% chance of £90 is £9 60% 0 0 30% 20 5</p> <p>Making a net yield of £3 and a loss of £6</p>	<p>50% chance of £70 is £35 40% 10 4 10% 110 11</p> <p>Making a net yield of £20 and a loss of £15</p>	<p>25% chance of £150 is £37½ 25% 70 17½ 25% 30 7½ 25% 70 17½</p> <p>Making a net yield of £30 and a loss of £25</p>	<p>80% chance of £92½ is £74 20% -170 -34</p> <p>Making a net yield of £40 and a loss of £34</p>

thus has a two-fold effect on the pattern of saving. The first operating via any changes that may occur in the volume of saving, and the second through changes that are brought about in the risk-yield attributes of particular investments.

#### (D) EFFECTS ON THE SUPPLY OF EFFORT

The earning of income, apart from that accruing from capital, involves work of some kind, i.e. the supply of effort. In the preceding sections of this chapter we have assumed that this income is given, but we must now see whether the imposition of the lump-sum tax might not affect an individual's decisions regarding the amount of work he is prepared to do, and hence the amount of income he earns.

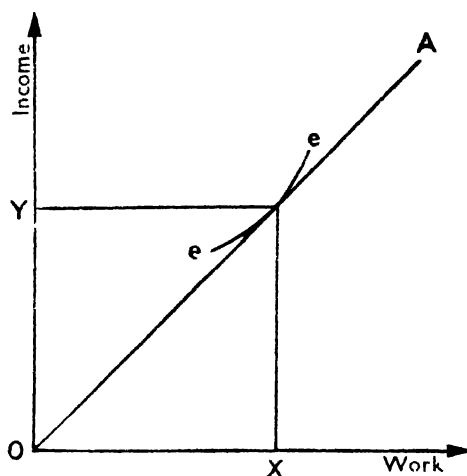


Figure 2.10

The relevant considerations can once more be elucidated by a simple geometrical analysis. In figure 2.10 the amount of work done is measured in physical units along the horizontal axis, and, assuming a fixed rate of reward, the amount of income earned (measured on the vertical axis) rises steadily as the amount of work increases, as shown by  $OA$ . The higher the rate of payment for work done, the steeper will  $OA$  be, and if the rate of pay increases more rapidly after a certain amount of work is done (e.g. for overtime, or as a bonus) the  $OA$  line would rise more sharply at that point. Since individuals will in general prefer more income to less, but less work

to more, the indifference curves will have the general properties indicated by  $ee$  in figure 2.10, which is the indifference curve just tangential to  $OA$ , showing the case where  $OX$  of work is done for an income of  $OY$ .

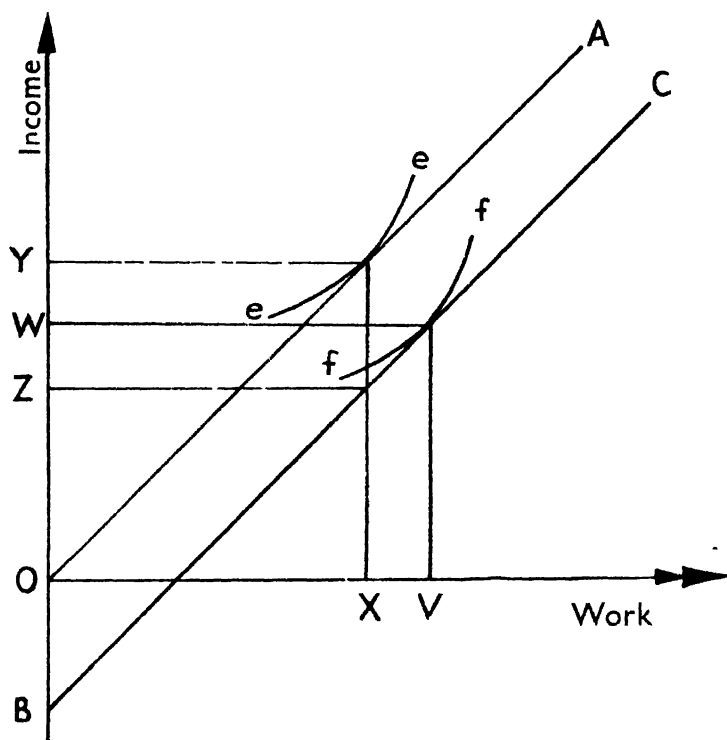


Figure 2.11

Now how does a lump-sum tax affect the situation confronting this individual? It reduces his income by a fixed amount no matter how much he works, and indeed he has to pay the tax even if he does no work at all, so that the effect is to shift  $OA$  to  $BC$ , as shown in figure 2.11, where  $BC$  is parallel to  $OA$ , and the distance  $OB$  represents the amount of the tax. The individual has now to decide which of the post tax possibilities represented by  $BC$  he prefers, and in figure 2.11 he is assumed to choose to do  $OV$  work for a net reward of  $OW$ , which is less than the income he enjoyed before ( $OY$ ) but more than the income he would have had ( $OZ$ ) if he had continued

to do the same amount of work ( $OX$ ). Other possibilities are, of course, quite conceivable, and could be represented by appropriately plotted indifference curves.

### (E) EFFECTS ON THE DISTRIBUTION OF EFFORT

Finally, we must turn to the decisions an individual makes concerning the directions in which his effort is expended. The considerations here are analogous to those outlined when considering the pattern of saving. Firstly, if the tax affects the total supply of effort, there may well also be a change in its relative distribution. But the tax will also affect the relative attractiveness of various kinds of work. This is because the tax reduces the net monetary rewards enjoyed by the individual, and so he may be forced to give up some unpaid or lowly paid charitable work in order to devote more time to better paid jobs. Thus, the overall amount of work done may remain unchanged, but the rate of reward be increased by changing the *nature* of the work done. In terms of figures 2.11 this means a shift in the  $OA$  and  $BC$  lines and a reconsideration of his preferences.

### (F) CONCLUSIONS

From this analysis of the effects of a lump-sum tax upon the behaviour of an individual, we may conclude:

Firstly, from section (D), that it may lead him to change the amount of work he does, and therefore the income which he earns. He may work more, in order to make up, in part at least, part of the income which the tax takes away from him, or he may get discouraged and work less, thereby reducing his income still further. Or he may simply be unaffected by the tax as regards the amount of work he is willing to do. His precise reaction will depend upon his general attitude to work (he may have very clear and determined views as to what constitutes a 'fair day's work') and to the income which he earns thereby (he may have heavy fixed commitments, like mortgage payments, which force him to maintain quite a high level of net income, or he may be desperately anxious to maintain his general living standard, or, on the other hand, he may regard his marginal earnings as dispensable, and leisure as much more important). Which of these various attitudes proves to be the more powerful can only be discovered by the careful collection and interpretation of information in each case. No general *a priori* pronouncements can be

made on the basis of theoretical analysis alone, for all that the theory demonstrates is the interplay of conflicting forces, with no determination of any particular outcome.

Secondly, from section (E), that the tax, through its effect on total disposable income and the amount of work done, may affect the distribution of an individual's efforts between various occupations. But it will also have such an effect independently of the influences propagated through the actual volume of work done, for different kinds of work offer differing kinds of reward, and the tax affects only the monetary reward. To the extent that individuals have a range of choice open to them, they may switch from jobs with low monetary rewards but better general working conditions or high prestige, to jobs where 'the money is good' even though in other respects they are less desirable. Again, no general pronouncements can be made, it will depend on opportunities and attitudes.

Thirdly, from section (B), that unless the individual works so much harder that he manages to restore his post tax income to the level he enjoyed when there was no tax, he will have to make adjustments either in his consumption expenditure or in his saving or both. The exact nature of this adjustment will depend on the time-pattern of his desired consumption relatively to that of his income. It will also be affected by present and expected future interest rates, though it does not follow that he will necessarily save more when interest rates rise, or vice-versa. Again, the theoretical analysis only indicates what are the crucial considerations, precise outcomes depend on the assembly and analysis of the relevant empirical data.

Fourthly, from section (C), that the tax will probably affect the pattern of saving, i.e. the distribution of the 'portfolio' between risky but high-yielding assets and riskless but low-yielding ones. The critical elements here are similar to those concerning the distribution of work. There is a possible effect via changes in the volume of saving, and a possible effect because the balance between the pleasant and unpleasant attributes of each asset may be changed, and the outcome depends on how these changes interact with the individual's attitudes to risk-taking, etc.

Fifthly, from section (A), that if the volume of consumption expenditure is affected by the tax, then its composition is also likely to be affected, for it is unlikely that a certain cut in the total will lead to precisely equi-proportionate cuts in each of the components.

The space allotted to the analysis of lump-sum taxes here is certainly not justified by their importance in actual tax structures, but rather because they serve as a useful reference standard against which

to set other taxes. By definition, the amount of a lump-sum tax is not affected by the behaviour of the individual taxpayer, so he has to take it as given, and his reaction to it is therefore rather passive. With all other taxes, there is some possibility of avoiding the tax, in whole or in part, by appropriate reactions, and what we shall be concerned with subsequently will be the extent to which various taxes present these possibilities, and the extent to which they are similar to a lump-sum tax.



## CHAPTER THREE

### Personal Income Taxes

Taxes on personal incomes are the best known of the direct taxes. They normally involve a definition of income, with certain exemptions, allowances or permissible deductions, the setting of a tax period, and the application of a tax rate, or, more commonly, a whole structure of rates. Before going into the more complicated cases which arise through particular problems associated with each of these elements of the tax, we will first consider a straightforward case where all such complications are, for the time being, neglected.

#### (A) A SIMPLE PROPORTIONAL INCOME TAX

This will be analysed under the same general headings as was the lump-sum tax in the preceding chapter.

##### (i) EFFECTS ON THE PATTERN OF SPENDING

The income tax behaves exactly like a lump-sum tax in this respect, for it does not discriminate between the goods and services available for purchase, but exerts an influence only through changes in *total* spending. The analysis of section (A) of Chapter II is therefore also valid here.

##### (ii) EFFECTS ON SPENDING VS. SAVING

Here the income tax does have an impact different from that of a lump-sum tax, for not only does it reduce the initially expected incomes, but it also reduces interest receipts, and payments too if the latter are a permissible deduction from income for tax purposes. Thus instead of the analysis earlier associated with figure 2.6, we must now conduct an analysis which takes account of this new feature in the situation.

This is done in figure 3.1, where the first difference to be noted is that the proportional income tax will shift the pre-tax position  $Y$  to  $U$ , which is on a straight line (not shown) between  $O$  and  $Y$ . In the lump-sum tax case,  $V$  in figure 2.6 was equi-distant from  $Y$  both horizontally and vertically, whereas  $U$  in figure 3.1 represents

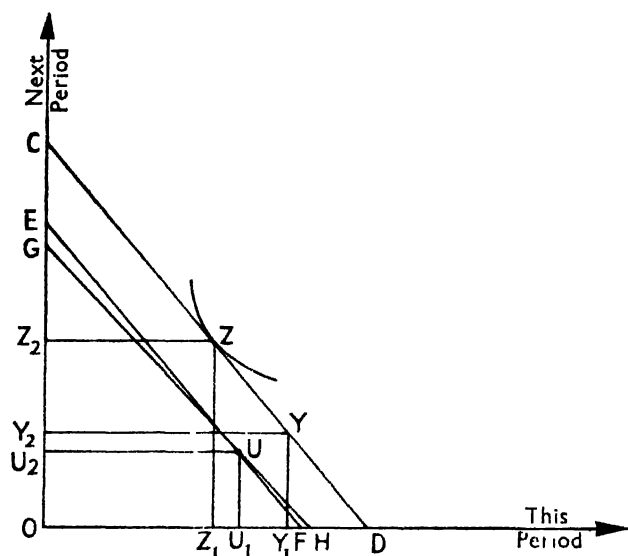


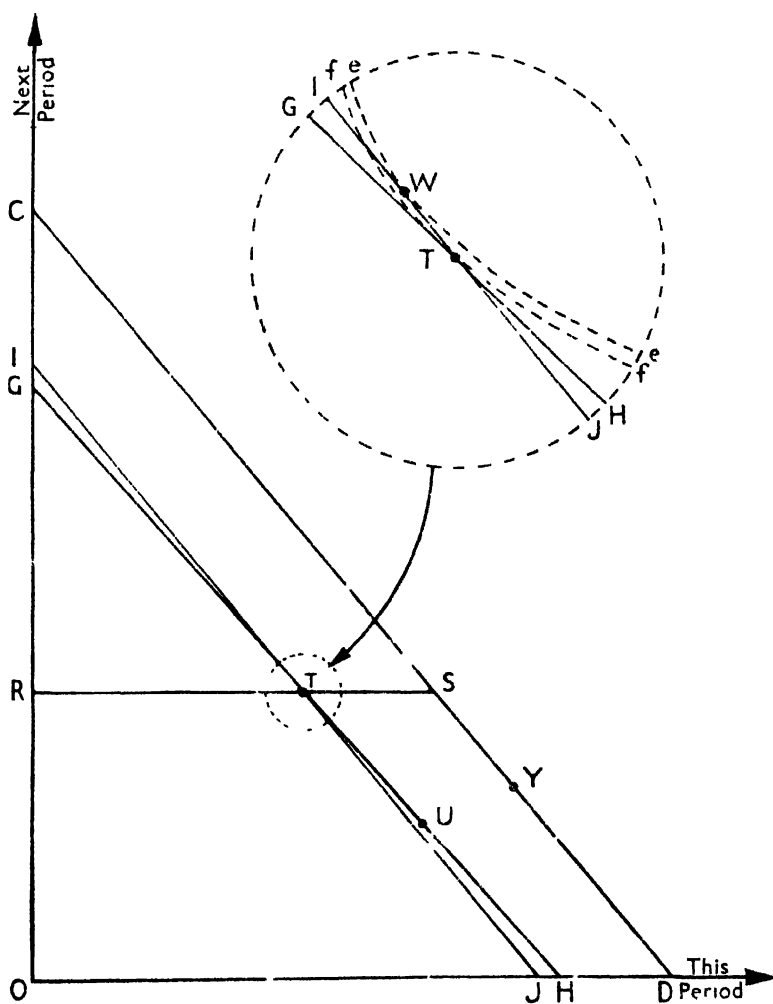
Figure 3.1

an equi-proportional reduction in  $Y_1$  and  $Y_2$  instead of an equal reduction in absolute terms. The second difference is that the new possibility line is *not*  $EF$  (which is parallel to  $CD$ ) but  $GH$ . This is because the income tax will also be levied on the interest receipts, thus reducing the effective net rate of interest received. Conversely, if interest payments are a permissible deduction from income for tax purposes, then this effectively reduces the net rate of interest payable on borrowings. Thus  $GH$  will pass through  $U$  at an angle that leaves it somewhere between  $EF$  and the no-interest case (not shown on figure 3.1) where the opportunity line would be at 45° to each axis. This 'swing' in the possibility line as a result of the imposition of the income tax is what is sometimes referred to as 'the double taxation of saving'.

As with the earlier analysis of lump-sum taxes, the precise effect on any individual's spending, saving behaviour will depend on the desired time-pattern of his consumption expenditure in relation to the expected distribution of his income receipts through time. Although this is all that can be said about the post-tax as opposed to his pre-tax position, some more definite conclusions can be reached about the *relative* effects of a lump-sum tax and of an income tax of the sort we are here considering. In order to make the comparison strictly

one concerned with the *form* of the tax, we must eliminate differences in the total amount of tax levied under the two systems. The comparison is therefore between a lump-sum tax and a proportional income tax of the same yield from the individual in question.

Such a comparison is made in figure 3.2, where the case of a lender is considered. Nevertheless, it will be seen that the same conclusions



**Figure 3.2**

will follow, with appropriate changes in terminology, for the case of the borrower, since the situation depicted in the inset to figure 3.2 would also arise if the point  $T$  fell in the range  $UH$  (the case of a borrower). As before,  $CD$  is the possibility line before tax, with  $Y$  the expected income in the two periods. The simple proportional income tax shifts  $Y$  to  $U$ , and swings the opportunity line to  $GH$  (as in figure 3.1). On this line the individual is assumed to choose the point  $T$ , where  $GII$  is tangential to the indifference curve  $ff$  (see inset). Measured in terms of this period's income, the total tax payment in this situation is  $TS$ , where  $RS$  is a horizontal straight line through  $T$ . We now have to compare this with a lump-sum tax which will also yield  $TS$ . The opportunity line resulting from the imposition of such a tax will be  $IJ$ , which is parallel to  $CD$  at a horizontal distance of  $TS$  from it (e.g.  $HD - TS$ ). Now because of the 'swing' effect associated with the income tax, the opportunity line  $IJ$  will be steeper with respect to the horizontal axis than will  $GH$ . Since  $IJ$  intersects  $GII$  at  $T$  where the latter is tangential to an indifference curve,  $IJ$  will intersect that indifference curve (see inset), and itself be tangential to a higher one ( $ce$ ) at  $W'$ , which will lie to the left of  $T$ .

Translated into everyday terms, this means firstly, that the individual is better off under a lump-sum tax than under a proportional income tax of equal yield, and, secondly, that the individual saves more (or borrows less) under a lump-sum tax than under a simple proportional income tax of equal yield. Note, however, that we are assuming that expected income before tax and the gross interest rate are not affected by either tax, or else are affected in the same way by both.

### (iii) EFFECTS ON THE PATTERN OF SAVING

Here again we may distinguish two effects, one associated with changes in the volume of saving, and the other independent of it. Such effects as occur through changes in the volume of saving are analysable in precisely the same terms as in the case of the lump-sum tax discussed in the previous chapter (see figure 2.7), although the actual volume change will, as we have seen, be different. The effect on the pattern of saving, assuming that there is no volume change, is however rather different from that in the lump-sum tax case.

It will be assumed that the proportional income tax allows full offsetting of any losses that may arise, so that the tax reduces expected losses in the same proportion as it reduces expected gains. This means that for any point (such as  $IV$ ) on  $OA$  in figure 3.3, there is a corresponding post-tax position (such as  $VI$ ) on  $OD$ , on a line

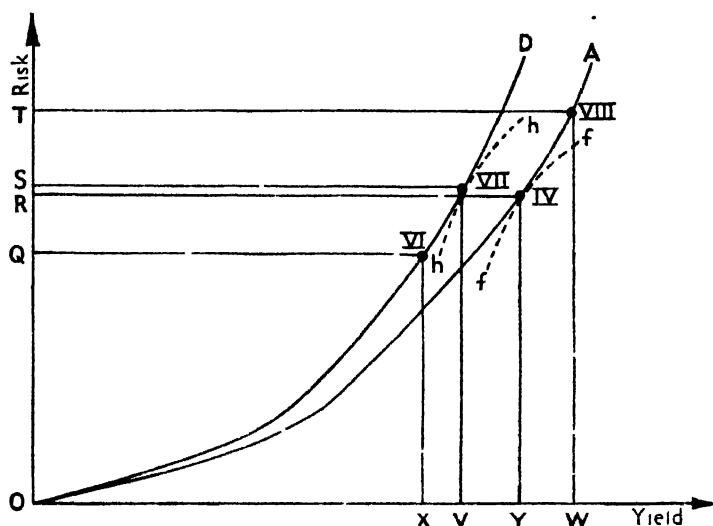


Figure 3.3

from the former to the origin. The individual's opportunity line is therefore really  $OD$ , and if, as is assumed in figure 3.3, his chosen position on this line is VII, this corresponds to a pre-tax position VIII on  $OA$ . Thus what would have happened in this case would have been a slight increase in riskbearing (by  $RS$ ) by the individual, with total riskbearing increasing by  $RT$  (since the Government, by allowing tax rebates on possible losses, bears the risk  $ST$ ). The individual's expected yield nevertheless falls (by  $VY$ ), while the Government's expected tax yield is  $VW$ .

We can now compare this proportional income tax with a lump-sum tax of equal yield, to see what the relative effects of the two taxes are in this respect. This comparison is made in figure 3.4, where  $OA$  and  $OD$ , and the points VII and VIII, are the same as in the preceding figure. In addition we need to construct the opportunity line resulting from a lump-sum tax which yields  $VW$  from this individual. From our earlier analysis (see figure 2.9) we know that the lump-sum tax will shift a point such as VIII on  $OA$  to a point such as IX on  $BC$ , while from figure 3.3 we know that a simple proportional income tax with full loss offsets shifts VIII to VII. These have both been so constructed in figure 3.4 that the respective tax yields are the same ( $VW$ ). All the other points on  $BC$  can similarly be derived by the application of a lump-sum tax of amount  $VW$ , and

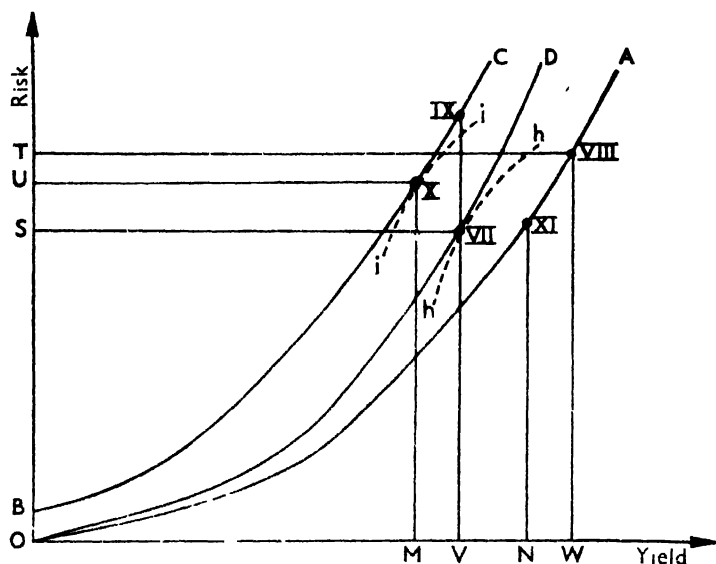


Figure 3.4

the individual when confronted with this lump-sum tax will therefore have to choose some point on  $BC$ . Making the usual assumptions about the structure of individuals' preferences, the normal case would be the choice of some such point as  $X$  on  $BC$ , which corresponds to a pre-tax position  $XI$  on  $OA$  (where  $MN = VW$ ). This indicates that the individual bears more risk (by  $SU$ ) under a lump-sum tax than under a simple proportional income tax with full loss offsets, where both taxes have the same yield, but that the total amount of riskbearing (i.e. by the individual and by the Government) is greater (by  $TU$ ) under the latter than under the former. But in spite of the increased risk that is borne by the individual under the lump-sum tax, his expected income after tax is lower (by  $MV$ ) than with the income tax. This is because of the very different impact of the two taxes upon the yield/risk attributes of any particular investment, resulting in choices having to be made from two entirely different post-tax possibility lines. In general terms, the individual will be better off (i.e. on a higher indifference curve) with the income tax than with the lump-sum tax.

#### (iv) EFFECTS ON THE SUPPLY OF EFFORT

Here again the proportional income tax differs in its effects from

the lump-sum tax analysed earlier (see figure 2.11). The immediate effect of the income tax is illustrated in figure 3.5, where  $OA$  is the opportunity line before tax, and  $OD$  is the opportunity line after the imposition of a simple proportional income tax. It cannot be said

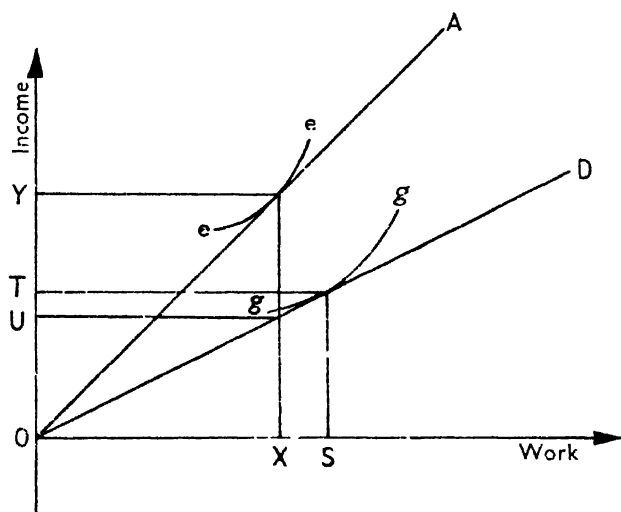


Figure 3.5

*a priori* whether the chosen position on  $OD$  will involve more or less work being done than before, for it depends on the interplay of the same opposing influences as were mentioned before. The case illustrated in figure 3.5 is that in which the individual increases the amount of work he does (by  $XS$ ) and by so doing raises his post-tax income slightly higher (at  $OT$ ) than it would have been (at  $OU$ ) if he had remained unmoved by the imposition of the tax. He is, of course, still much worse off than he was in the pre-tax position (when he did  $OX$  work for  $OY$  income).

If we now compare this outcome with that under a lump-sum tax of the same yield (as is done in figure 3.6) we shall find that the lump-sum tax will always lead to more work being done than will the proportional income tax. We saw from figure 3.5 that under the latter tax the individual will end up in some such position as  $I$  in figure 3.6, where  $OD$  is tangential to the indifference curve  $gg$ . At this point he earned an income of  $OV$ , of which  $VT$  was taken in tax. The equal-yield lump-sum tax must therefore also yield  $VT$ , and

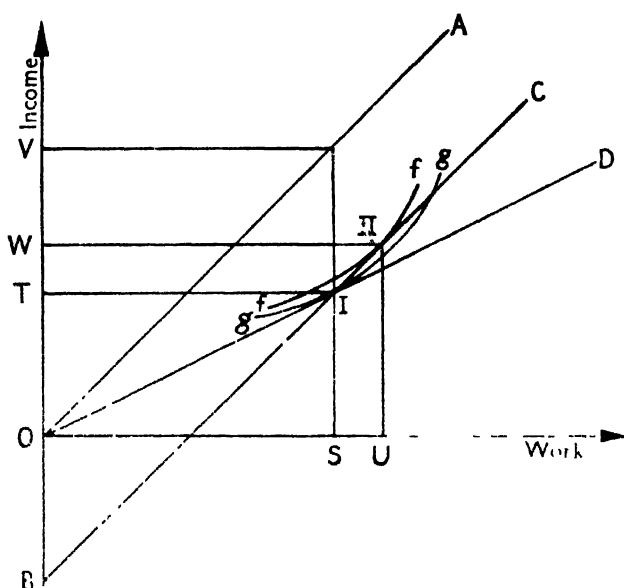


Figure 3.6

the line  $BC$  in figure 3.6 represents the impact of such a tax (where  $OB = VT$ ). Obviously,  $BC$  will pass through the previously chosen point  $I$ , and hence intersect the indifference curve ( $gg$ ) that was tangential to  $OD$  at that point, and itself be tangential to some higher indifference curve (for instance  $ff$ ) somewhere to the right of  $I$  (for instance, at  $II$ ). This shows that the individual is better off in this respect under a lump-sum tax than under a simple proportional income tax of equal yield, and that he will work more under the former than under the latter. Moreover, it should be noted that this conclusion is quite unaffected if the point  $I$  is such that the individual works less there than he did before any tax at all was imposed.

#### (V) EFFECTS ON THE DISTRIBUTION OF EFFORT

These will be similar to those analysed in section (E) of Chapter II, except that with a proportional income tax the *discriminatory* effect between well-paid and ill-paid work will be accentuated. This will make ill-paid work with untaxed non-monetary rewards relatively more attractive than before,



### (vi) CONCLUSIONS

A simple proportional income tax may lead to more or less (or the same amount of) work being done as before, but whichever of these outcomes results, the amount of work done will always be less than it would be with a lump-sum tax of the same yield from the individual in question (see section (iv)). The income tax will also make ill-paid work with untaxed non-monetary rewards relatively more attractive (section (v)). The effect upon spending/saving decisions will be to encourage spending and discourage saving relatively to a lump-sum tax of equal yield (section (ii)), but otherwise the effect on the pattern of spending will be the same (section (i)). The effect on the pattern of saving (section (iii)) will be to encourage more risk-bearing than would have occurred under a lump-sum tax of equal yield, provided that the simple proportional tax allows full off-setting of losses.

## (B) SOME COMPLICATIONS ASSOCIATED WITH INCOME TAXES

As was pointed out at the beginning of this chapter, few (if any) income taxes even approximate to the simple proportional type just analysed. There are complications concerning the definition of income, concerning the deductions and allowances to be permitted in adjusting actual or imputed receipt to taxable income, concerning the time element (in both assessment and collection), and concerning the rates of tax themselves, for there is seldom only one.

Since we are not here concerned primarily with the legal and administrative problems associated with taxation, we shall take as our starting point here some typical examples of such complications, without considering how or why they have arisen. We can then investigate their effects upon the behaviour of individuals, and see to what extent the conclusions we have just reached with regard to the simple proportional income tax have to be modified when these additional considerations are taken into account.

### (i) THE DEFINITION OF TAXABLE INCOME

Whatever system is used in defining income for tax purposes, it is commonly found that some classes of receipt get excluded, partially or wholly, from the tax base. Conversely, the individual may find that some of his receipts, which he does not consider to be part of his income, are considered to be part of his income by the taxing

authority. Here, for the sake of argument, we will take as an example of the former the complete exclusion of capital gains (i.e. increases in the value of assets) from income as understood by the taxing authority. No attempt will be made to argue the case for or against such treatment, or to go into its wider ramifications. The kind of analysis which follows can, with appropriate modifications in terminology, be made equally applicable to the case of partial exemption (or taxation of capital gains at preferential rates), or even to any other kind of exemption, such as earned income allowances, and the whole analysis can be thrown into reverse to deal with the converse situation mentioned above.

The effects of this upon the pattern of spending are no different from those analysed earlier, unless, of course, the actual volume of spending is affected differently. If we turn to spending 'saving decisions, there may be differences on two main grounds. Firstly, the way the tax falls on expected income (excluding the return from savings) now depends on the respective taxed and untaxed components thereof, and, secondly, the actual return on savings will be affected if this accrues wholly or partly in the form of untaxed capital gains. Thus, in terms of figures 3.1 and 3.2 above, an erratic element is introduced into the shifts from  $Y$  to  $U$ , and into the 'swinging' of  $GH$  with respect to  $LF$  or  $IJ$ . However, once this erratic element is identified and plotted, the subsequent analysis comparing this situation with that under a lump-sum tax follows the same course, and will, in general, reach the same conclusions. Only in the special case where the whole return on savings is in the form of untaxed capital gains will a different result emerge, for then there is nothing to choose between the income tax and the lump-sum tax of equal yield as far as this particular effect is concerned (for  $GH$  will not differ from  $LF$ , and when  $IJ$  is constructed it too will be found to coincide with them!)

When we turn to the effects on the pattern of saving, we again find an erratic element introduced, this time in the shift from  $OA$  to  $OD$  in figures 3.3 and 3.4. Obviously, those assets with which an expectation of great capital gains is associated will have their yields relatively little affected by the tax, while those where capital losses (which cannot be set off against taxable income) are anticipated will have their risk component relatively unaffected. Once these complications have been taken into account in constructing  $OD$ , however, and it has been plotted accordingly, the analysis follows the earlier course once more. If capital gains and losses are distributed proportionately to taxable income and offsettable losses respectively,

then the analysis would be essentially the same as before. In other cases the structure of the analysis will change, but the conclusions emerging from the comparison with a lump-sum tax of equal yield will remain valid.

The analysis of the effects on the supply of effort similarly affected, namely, the shift from *OA* to *OD* in figures 3.5 and 3.6 now depends on the capital gain component in *OA* at any given point. The handling of this situation should by now be familiar, and once again the results of the comparison with the lump-sum tax remain valid. Finally, when it comes to the effects on the distribution of effort, once we have identified the incidence of capital gains in the rewards from different kinds of work, we can analyse the discriminatory effects as before.

## (ii) PERMISSIBLE DEDUCTIONS AND ALLOWANCES

By permissible deductions are meant here those classes of expense that the taxing authority permits to be deducted from income (as defined by it) in determining the sum on which tax shall be charged, and for which it requires specific evidence that such outlays have been made. By allowances are meant those sums that the taxing authority allows to be deducted from income (in its definition) without requiring specific evidence of actual outlays (such as personal allowances, allowances for children and other dependents, etc.).

Where these permissible deductions and allowances are fixed in amount quite independently of the actual level or type of taxable income, then in most respects they can be treated analytically as lump-sum subsidies, and the earlier analysis of lump-sum taxes, thrown into reverse, will apply. Similarly, if they are proportionate to income, the analysis of the simple proportional income tax, thrown into reverse, will apply. Where such deductions and allowances are more erratic in their impact, we can deal with them as we did the exclusion of capital gains in the preceding section. But in the case of deductions linked to a specific class of expenditures, then there is clearly a further effect on the pattern of expenditure, for that class of expenditure becomes 'cheaper' relatively to expenditures that have to be met out of taxed income. The formal analysis of this aspect of permissible deductions would be the same as for an indirect subsidy on the expenditure in question (see Chapter X).

One particular sort of permissible deduction is worth going into more fully however, and that is the treatment of losses. When analysing the simple proportional income tax we assumed that if

losses occurred, a tax rebate would be allowed at the same rate as that at which tax would be payable in the event of a profit being made. In practice this is often not so. There may be limitations imposed upon the amount of loss that may be so treated, or it may be stipulated that losses can only be set off against certain classes of profit, or only carried forward to be set off against any future profits that may arise, or, in the extreme case, not allowed at all in computing taxable income. It will be convenient here to treat only this last case, in order to bring out as clearly as possible the effects of limiting loss offsets.

The effects on the pattern of saving are the most marked, although there are also important implications for the distribution of effort, which will be mentioned briefly in due course. Returning for the

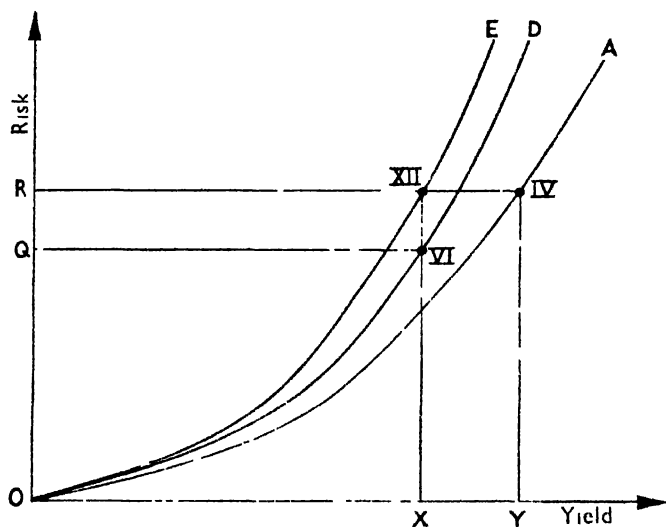


Figure 3.7

moment to figure 3.3. we saw there that the tax with full loss offsets reduced yield and risk proportionately. The tax with no loss offsets, on the other hand, reduced yield, but leaves risk unchanged. Thus, in figure 3.7, point IV on *OA*, which is the chosen position before tax, is shifted to the point VI on *OD* by the simple proportional tax with full loss offsets. A simple proportional tax with no loss offsets, giving the same tax revenue *XY*, would shift the point IV to XII on *OE*. It will be seen that with *OE* as the post-tax

possibility line, the individual has to assume more risk (by  $QR$ ) in order to get the same net income ( $OX$ ). However, if we compare the proportional income tax with no loss offsets with a lump-sum tax of equal yield, we still reach the same conclusion as before as will be seen from figure 3.8. Here it is assumed that the point chosen

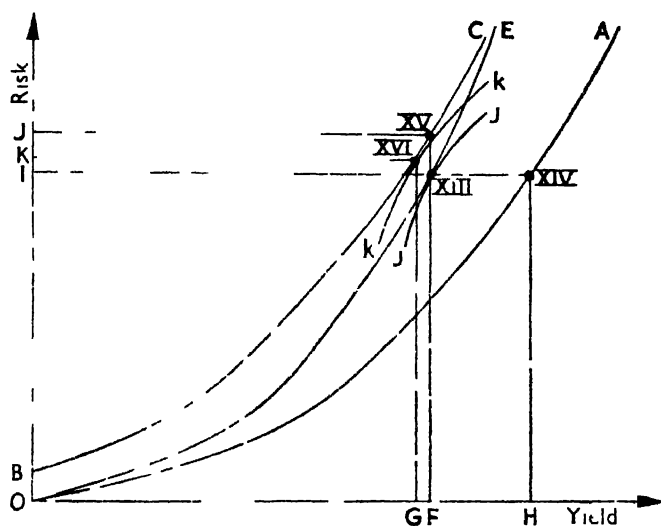


Figure 3.8

on  $OI$  (i.e. the possibility line after the imposition of the proportional income tax with loss offsets) is XIII, which corresponds to a particular position on  $OA$  of XIV. A lump-sum tax of equal yield ( $FH$ ) would shift XIV to XV on  $BC$  (compare points IV and V on figure 2.9).  $BC$  then plots all the other shifts that would result from a lump-sum tax of amount  $FH$ . It is obvious that the point chosen on  $BC$  (for instance, XVI in figure 3.8) will be inferior in the eyes of the individual (since  $kk$  is a lower indifference curve than  $jj$ ) to that attained under the proportional tax without loss offsets (while this, in turn, is inferior to the proportional tax with full loss offsets) where each tax raises the same revenue from the individual in question.

In general, what is happening is that the relative attractiveness of various alternatives is being changed, with consequent effects upon the choices that are being made. In the case analysed here it is the choice of asset-holdings that is being considered, but similar repr-

cussions could be analysed concerning the effects on the relative attractiveness of jobs (according to the risks involved), especially in conjunction with the complications to be raised in section (iv) below. Thus what our present analysis does is to introduce a further discriminatory effect into the analysis of sections (C) and (E) of Chapter II, in addition to those mentioned in section (A) above.

### (iii) COMPLEX RATE STRUCTURES

In a roundabout way we have already introduced some variations in the rate structure, for the exemption of some sort of receipt, permission to deduct certain expenses, and fixed allowances, all affect the effective rate of tax, and may do so in a systematic way as between different levels of income if, for instance, the exempted receipt (or permitted expense) is usually confined to the earners of the higher incomes, or, conversely, if the allowance is fixed in money terms irrespective of income. In the former case an ostensibly proportional tax will, in effect, fall at a greater rate on the lower income groups than on the higher, and conversely in the latter case, without there being any departure from the proportionality of the tax rate.

But we must now take account of deliberate variation of the tax rate itself. As an example we can take the case of a progressive rate structure, i.e. one where the *rate of tax* (and not simply the amount of tax payable) rises as taxable income rises. The commonest way of achieving this is by stepping up the tax rate on each successive 'slice' of income, e.g. allowing the first 500 units of income free of tax, charging tax at a rate of 5 per cent on the next 100, 10 per cent on the next 100, 25 per cent on the next 100, and 50 per cent on the remainder.

If such a progressive tax leaves the individual with the same sum to spend (on goods and services other than leisure) as did the proportional income tax we considered earlier, then the analysis as regards the pattern of spending conducted there will still be valid. The total amount the individual is willing and able to spend on such goods and services depends, of course, on the effects of the progressive tax on the supply and distribution of effort and of saving. Nevertheless, it remains true that a progressive income tax will affect the *pattern* of expenditure only indirectly via its effects on *total* expenditure.

The effect on decisions to spend or save can be analysed in a way essentially similar to that pursued in figure 3.2 above, which dealt with a proportional tax. For the case of lenders this is done in figure 3.9, where *CD* is again the pre-tax position (including the effects of



what would be the effect of a progressive income tax of that same yield. The first thing to note is that a progressive tax, because of its dis-proportionate impact upon fluctuating incomes (analysed more fully in section (iv) below) will shift  $Y$  not to  $U$  but to somewhere in that part of the 'wedge' formed by a line through  $OY$  and the 45° line from the origin, that lies below the horizontal line drawn leftwards from  $Y$ . In figure 3.9 it has been assumed that the shift is from  $Y$  to  $R$ . The second thing to note is that as lending increases and interest receipts rise, the rate of tax rises too with a progressive tax structure, hence the post-tax possibility line  $RK$  diverges from  $CD$  at an increasing rate as the individual moves from  $R$  to  $K$ . Similarly, when borrowing is taking place,  $RL$  approaches  $CD$  at an increasing rate as the individual moves from  $R$  to  $L$ . The condition of equal tax yield requires that the individual's chosen position must be somewhere on  $IJ$ , and it follows necessarily that the marginal tax rate under the progressive tax at the intersection of  $KL$  and  $IJ$  will be greater than that under the proportional tax ( $GH$ ). Now from the way in which successive indifference curves intersect  $IJ$  as one moves along it, it will be clear that  $KL$  can only be tangential to an indifference curve on  $IJ$  at some point below  $T$  (i.e. between  $T$  and  $J$ ), and such a point is illustrated in figure 3.9 by  $S$ . An examination of this result will show that the individual is worse off at  $S$  than at  $T$  (and, *a fortiori*, than at  $W$ ), and hence will prefer a proportional (and, *a fortiori*, a lump-sum) tax to a progressive tax of equal yield. Moreover, it will be seen that the individual will lend less (or, in the converse case, borrow more) when confronted with a progressive tax than when confronted with a proportional tax (or, *a fortiori*, a lump-sum tax) of the same yield.

There will, of course, be effects on the pattern of saving through any such change in the volume of saving, but there will also be effects even if it were unchanged. In terms of the earlier diagrammatic analysis (figures 3.7 and 3.8) the post-tax opportunity line under a progressive tax differs from that under a proportional tax for two reasons. Firstly, in general, higher average yields are affected more and lower average yields less, except that, secondly, fluctuating yields are affected more than stable yields (see next section). Unless it is assumed that 'fluctuating yields' and 'risk' are systematically associated with each other, this will introduce an erratic element into the shift from the pre-tax to the post-tax possibility line. With the rather simple concept of risk we are employing (i.e. the mathematical expectation of loss) no such association is implied, for a 'fluctuating' yield may simply mean a wide range of positive expectations, and not



necessarily any negative ones. This indicates one of the weaknesses of over-simplified concepts, but rather than tackle the problem by more sophisticated methods, it will probably be more enlightening to leave the analysis as it stands at this point, and rest content with a few general qualifying comments. Clearly those parts of the portfolio offering high, fluctuating, yields will suffer more tax under a progressive than under a proportional rate structure, while those offering low, stable, yields will suffer less. The outcome upon the actual choice of portfolio in any particular case does not depend entirely upon this aspect of the situation, however, but also upon the nature of the provisions for offsetting losses (for these can act as averaging devices to ameliorate or even cancel out the discriminatory effects of progressive taxes on some fluctuating yields), and, ultimately, upon the individual's own particular attitude to yield and risk (i.e. will he decide to take more risk in the hope of recouping part of the income lost in tax, or will he shift to less risky investments once the 'risk premium' has been reduced?).

When we turn to the effects of a progressive tax on the supply of effort, we see from figure 3.10 that the pre-tax income line  $OA$  is shifted to some such position as  $OL$ . We cannot say, *a priori*, whether

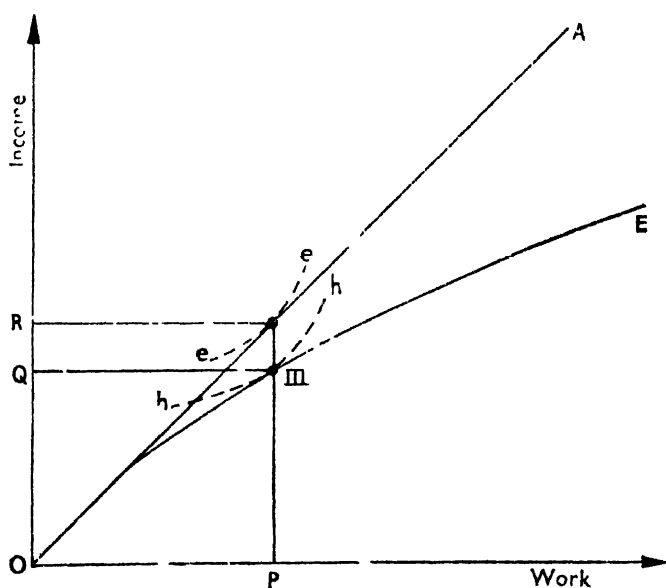


Figure 3.10

the point chosen by the individual on  $OE$  will be one where he does more or less work than he did before tax, for the same reasons as those given earlier (see section (F) of Chapter II). In figure 3.10 is illustrated the special case where the point (III) chosen on  $OE$  involves the same amount of work ( $OP$ ) being done as in the no-tax case, though for a net income of  $OQ$  instead of  $OR$ .

If we compare the effects of this progressive tax with those of the simple proportional tax and the lump-sum tax, we can reach a more definite result. Here we conduct the same sort of analysis as in figure 3.6 above, comparing taxes of equal yield. Thus in figure 3.11 the curve  $OE$  represents the possibility line after the imposition of the progressive tax, on which the chosen point is III (compare figure 3.10), and the amount of tax paid is  $QR$ , leaving a net income of  $OQ$  for doing  $OP$  work. If a lump-sum tax is now imposed which gives the same yield  $QR$  ( $OB$ ) from this individual, it would produce the possibility line  $BC$ , which will obviously pass through the point III, intersecting the indifference curve  $hh$ , and being tangential (at II) to a higher indifference curve ( $f$ ) somewhere above and to the right of III. Thus we find, as with the proportional income tax, that the individual will both feel better off and do more work under the lump-sum tax. But what about the progressive versus the proportional income tax? From figure 3.12 (which is a sort of fusion of figure 3.6

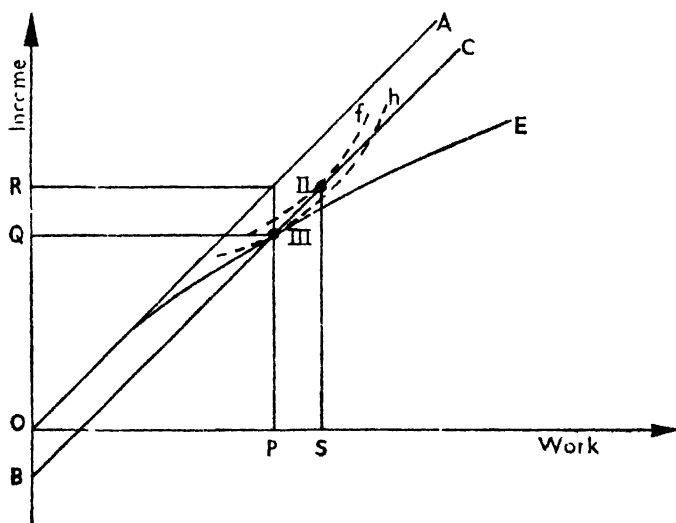


Figure 3.11

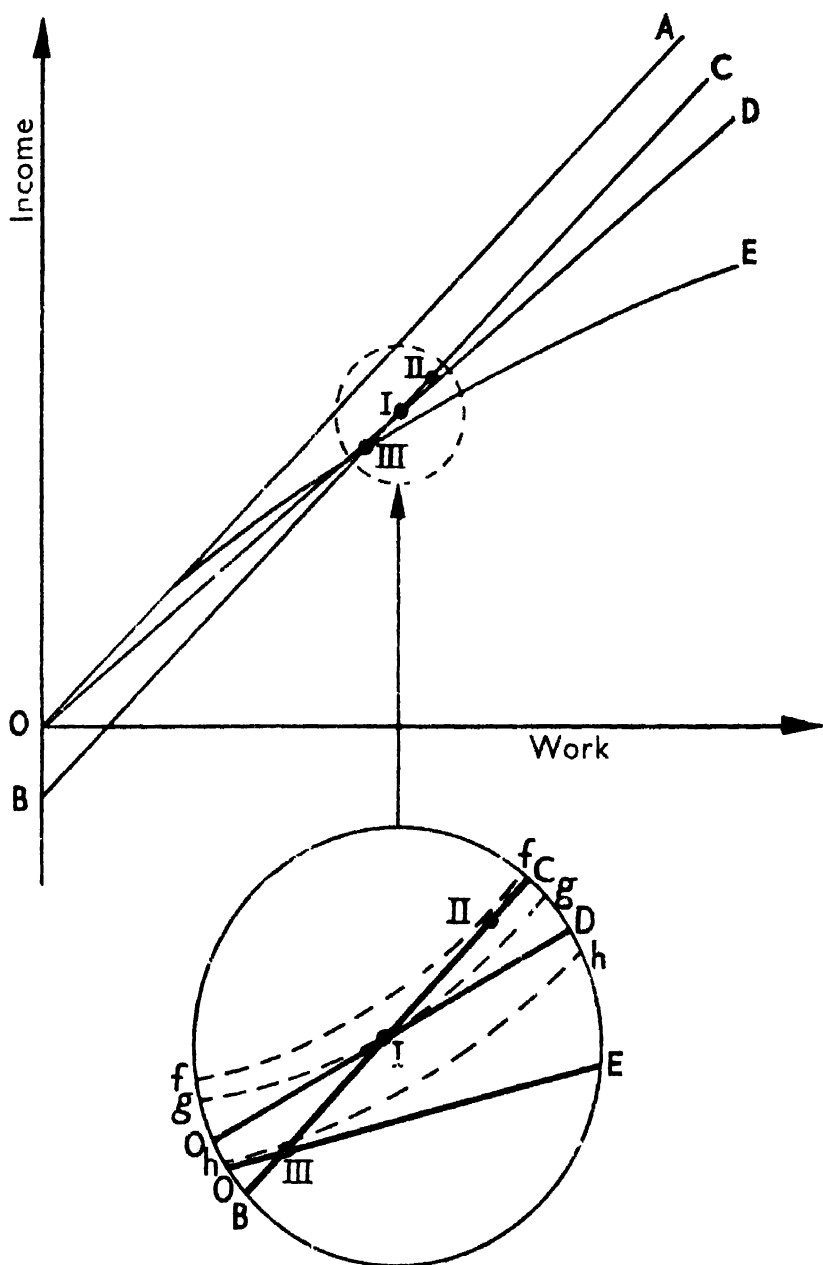


Figure 3 12

and 3.11) it will be seen that the proportional income tax will give an intermediate outcome (I) between the lump-sum tax case (II) and the progressive tax case (III). This is because to be an equal yield tax it has to leave the individual somewhere on  $BC'$ , while, being a simple proportional tax, it will generate an opportunity line which is a straight line from the origin ( $OD$ ). For the individual to choose the point on an opportunity line where it intersects  $BC$ , the opportunity line must be tangential to an indifference curve at that point. We therefore have to find a point on  $BC$  where a straight line from the origin is tangential to an indifference curve. By inspecting the angles at which successive indifference curves intersect  $BC'$  as one moves away from point II in either direction, it will be seen that the point we are looking for (I) must lie somewhere between II and III (see inset to figure 3.12). Moreover, by similar reasoning it can be shown that a regressive income tax will lead the individual to choose a point on  $BC'$  somewhere between I and II.

These findings may be interpreted in another, less technical, way by referring back once more to the two conflicting forces that determine the overall effect of an income tax upon the supply of effort. The first, or 'income effect', stimulates the individual to take less leisure (do more work) in order to offset, in part at least, the income-reducing effects of the tax. The second, or 'substitution effect', leads to more leisure being taken (less work being done) because the marginal tax rate reduces the net reward for work (which is the price of leisure) hence making leisure more attractive relatively to other goods and services. Now within the framework of reference being used above, the 'income effect' of each of the taxes is precisely the same, because each is assumed to give the same yield in tax revenue from the individual in question. Differences in the individual's reactions must therefore be due to differences in 'substitution effects'. Such differences will arise because of the differing *marginal* rates of tax in each case, these being highest in the case of the progressive tax, and lowest (indeed zero) with the lump-sum tax. Thus the rating of successive taxes in their effects on the supply of effort follows their respective ratings according to their marginal impact on rewards. Hence we may conclude that *whatever may be the effects on the supply of effort relatively to the pre-tax position*, provided that each tax has the same yield from the individual in question, less work will be done with the progressive tax with any of the others, less with a proportional tax than with a regressive or lump-sum one, and less with a regressive than with a lump-sum tax.

Finally, the effect on the distribution of effort depends on much

the same sort of considerations as were crucial in determining the effect on the savings portfolio. Effort offering a fluctuating taxable return will be more heavily taxed than that offering a stable taxable return, but the overall effects depend also upon the non-taxed returns and upon the attitude towards income and work displayed by the individual in question.

Our most important results are that *a progressive rate structure which takes the same amount of tax from an individual as a simple proportional tax will cause him both to work less and to save less than under the proportional rate structure*, though this does not necessarily mean that less work will be done or less income saved than in the pre-tax situation. The only effect on the pattern of spending will be that which operates through the volume of spending and the effects on the distribution of savings and effort are uncertain.

#### (iv) TIMING

It is in conjunction with non-proportional tax rates that the problems associated with timing become most acute, for, with a progressive (or regressive) tax, incomes distributed unevenly through time bear more (or less) tax than an income of the same aggregate amount which is spread evenly through time, as will be seen from the arithmetic example set out in the table on the following page. Thus occupations or investments offering fluctuating returns are more heavily taxed with the given rate structure, and there may therefore be some effect on the distribution of effort and on the pattern of saving.

This raises the whole problem of the choice of the unit period in determining taxable income. If a year is taken strictly as the period of assessment, then this means that averaging of income through time occurs without restriction within the tax year, but is absolutely ruled out between one year and another. Often, an intermediate position is taken up by the tax authorities, whereby a year is taken as the normal period of assessment, but there are special provisions for averaging annual taxable income over a limited number of years. It will be seen from the table on the next page that if it were permissible to take any two consecutive years and average out taxable income between them, the tax liability of all but individual A would be reduced. It has been argued that the proper period of assessment for any individual is his whole life-time, and that cumulative averaging should be permitted so as to attain this, but so far the administrative complications involved have precluded any attempt to reorganize personal direct tax assessments along these lines.

Against this it has been argued that cumulative systems have marked disincentive effects, especially when operated through withholding systems of tax collections. If income falls sharply, then it may not be simply that tax payments cease, but that tax rebates are paid, which may be of quite considerable magnitude. It is alleged that this leads to the taking of 'tax holidays', i.e. periods away from work when one lives on one's tax rebates. Conversely, of course, when income rises once more, the tax payment also rises sharply. Both these effects are illustrated in the table on the next page. In the matter of the time distribution of effort, however, it is difficult in principle to determine the more likely outcome, for we are again faced with the problem of assessing the effects of the tax system upon two conflicting desires, that for income and that for leisure. Some people may, under a withholding system of the type just described, be strongly influenced by the violent swings in the apparent price of leisure that occur when income fluctuates from week to week, and therefore tend to even out the supply of effort through time. Others may regard the high tax payments of one period as a sort of 'forced saving' which they will use to finance leisure at some later period. The only firm conclusion that can be reached in principle is that the method of tax collection, as well as the amount collected, is a relevant consideration in assessing the effects of personal direct taxes.

ILLUSTRATION OF THE EFFECTS OF PROGRESSION ON TAX PAYMENTS WHEN INCOMES ARE UNEVENLY DISTRIBUTED THROUGH TIME

Assumed tax structure: 20 per cent on first 100 units of taxable income, 40 per cent on next 100, 60 per cent on next 100, and 80 per cent on the remainder.

	Period I	Period II	Period III	Period IV	Period V	Total
<i>Individual A</i>						
Taxable income	200	200	200	200	200	1,000
Tax payment	60	60	60	60	60	300
<i>Individual B</i>						
Taxable income	100	100	200	300	300	1,000
Tax payment	20	20	60	120	120	340
<i>Individual C</i>						
Taxable income	0	200	400	300	100	1,000
Tax payment	0	60	200	120	20	400
<i>Individual D</i>						
Taxable income	1,000	0	0	0	0	1,000
Tax payment	680	0	0	0	0	680

## CUMULATIVE AVERAGING UNDER ILLUSTRATION OF THE EFFECTS OF A WITH-HOLDING SYSTEM WITH TAX REBATES

Distribution of income through time and tax rates the same as in the preceding table. Cumulative averaging over entire five periods, so that overall aggregate tax payments the same in each case, although marked variations occur in the timing of these payments.

	Period I	Period II	Period III	Period IV	Period V	Total
<i>Individual A</i>						
1. Taxable income	200	200	200	200	200	1,000
2. Cumulative average taxable income per period	200	200	200	200	200	
3. Average amount of tax due per period	60	60	60	60	60	
4. Amount of tax already paid	-	60	120	180	240	300
5. Amount of tax due currently	60	60	60	60	60	
<i>Individual B</i>						
1.	100	100	200	300	300	1,000
2.	100	100	133.3	175	200	
3.	20	20	33.3	50	60	
4.	-	20	40	100	200	300
5.	20	20	60	100	100	
<i>Individual C</i>						
1.	0	200	400	300	100	1,000
2.	0	100	200	225	200	
3.	0	20	60	75	60	
4.	-	0	40	180	300	300
5.	0	40	140	120	0	
<i>Individual D</i>						
1.	1,000	0	0	0	0	1,000
2.	1,000	500	333.3	250	200	
3.	680	280	146.6	90	60	
4.		680	560	440	360	300
5.	680	- 120	- 120	- 80	- 60	





## CHAPTER FOUR

### A Direct Expenditure Tax

A *direct* tax on personal expenditure is a tax on the individual levied according to his total expenditure (instead of according to his total income, as in the previous chapter). It is to be distinguished sharply from an *indirect* tax on expenditure, such as a sales tax, which is levied at a rate (or set of rates) which does not vary with the circumstances of the particular individual paying the tax. Fundamentally, a direct expenditure tax is based on the proposition that expenditure is better than income as an index of taxable capacity. The merits of this proposition will not be discussed here. Instead, the analysis will be confined to an assessment of the likely effects of such a tax, if adopted, upon savings, spending, the supply of effort, etc., in comparison with an income tax yielding the same amount of tax from the individual in question. For simplicity's sake, it will be assumed that the direct expenditure tax is a simple proportional tax, as will be the income tax with which it is compared. The complications associated with a direct expenditure tax will not be introduced here, however. This is not because there are no such complications, nor because they are unimportant but rather because they arise in the same way as did the complications associated with income taxes, so that, making the necessary adjustments in terminology, the conclusions reached in section (B) of the preceding chapter will apply here too.

#### (A) A TWO-VARIABLE ANALYSIS

So long as all expenditures rank equally in calculating the tax base, there will be no effect on the pattern of spending except that generated through changes in the volume of spending. Similarly there will be no effect on the pattern of saving or the distribution of effort except those that occur through changes in their respective totals. It is therefore changes in total spending, total saving, and the overall supply of effort on which we must concentrate our attention.

The effect on decisions to save or spend out of a given income can be analysed quite simply by referring back to figure 3.2. There

the pre-tax income  $Y$  was shifted to  $U$  by the simple proportional income tax, and the consumption opportunity line shifted (and swung) from  $CD$  to  $GH$ . On  $GH$  the individual chose to be at  $T$ , where the tax yield was  $TS$ . Now what would the opportunity line look like that resulted from the imposition of a simple proportional direct expenditure tax which gave this same yield in tax? Clearly it will be  $IJ$  (which is parallel to  $CD$  at the required distance  $TS$  from it). We already know that the preferred point on  $IJ$  is  $W$ , so this must be the preferred position under the expenditure tax, so that our conclusion is the same in this case as when we were considering the lump-sum tax, namely, that the individual is better off than with the proportional income tax, and that he saves more (or borrows less), assuming that the tax yields are the same. Within this framework of

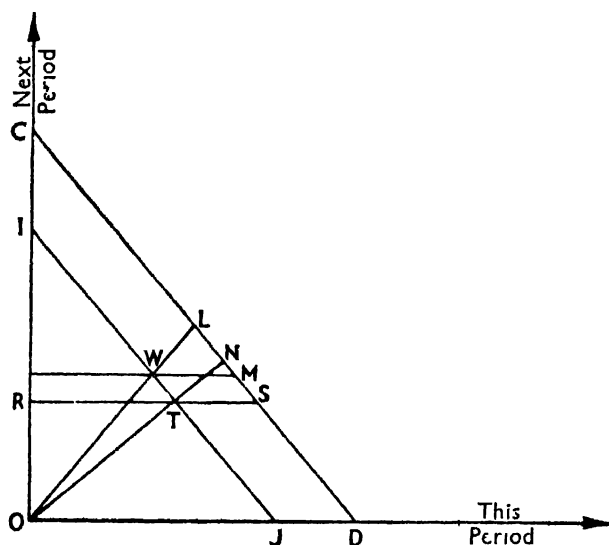


Figure 4.1

equal yield taxes, the differences in the way the tax is calculated can be illustrated with reference to figure 4.1. Here, the lump-sum tax is simply a fixed amount  $TS$  ( $WM - JD$ ). For the simple proportional

income tax the rate of tax is  $\frac{TN}{ON}$  ( $= \frac{WL}{OL}$ ), for  $ON$  is the tax base (total income) and  $TN$  the amount of tax. For the simple proportional expenditure tax the rate of tax is  $\frac{WL}{OW}$  ( $= \frac{TN}{OT}$ ), for  $OW$  is now

the tax base (total expenditure) on which the amount of tax  $WL$  is paid.

The above conclusion concerning spending vs saving was however based on the assumption that pre-tax income ( $CD$ ) was fixed. Now  $CD$  depends on earned income and the rate of interest, so we must consider whether these are likely to be different under a direct expenditure tax from what they would be under an income tax. If saving increases (or borrowing decreases) for all individuals under the expenditure tax, then, other things being equal, one would expect the rate of interest to fall. But this can only be a relatively small adjustment, and will lead only to a moderation of the magnitude of the shift, not to any substantial change in our conclusions.

A more important consideration is how the expenditure tax will affect the supply of effort. The search for an answer to this question is made more difficult by the fact that the earning of more income by increasing the supply of effort does not, in itself, increase the liability of the individual to the expenditure tax, for it is only when some or all of these proceeds are spent that they enter into the tax base. This means that we really need an analytical framework which can simultaneously take account of the relative effects of the two taxes on spending, saving, *and* the supply of effort. But before we go on to construct such a framework we will first consider this

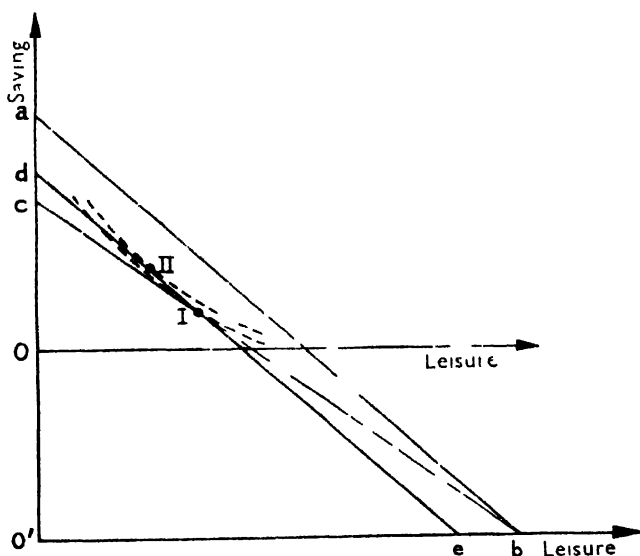


Figure 4.2

problem within the same two-variable context as has been employed hitherto. This will have the incidental effect of emphasising an important limitation upon the validity of our earlier results, which must now be made explicit.

The analysis of consumption vs. saving has proceeded on the assumption that the amount of work done (or leisure enjoyed) is held constant. We could then go on to consider the effects on leisure vs. saving on the assumption that spending is constant, and finally the effects on leisure vs. consumption, holding saving constant. Let us briefly run through these last two cases in turn. In figure 4.2 we assume that consumption is fixed at a level  $O'O$ . As leisure is given up (i.e. as the individual moves from  $b$  towards  $O'$ ) more income is earned (as indicated by  $cb$ ), this income first going to meet the fixed consumption expenditure (i.e. in the segment of  $ab$  lying below the horizontal axis from  $O$ ), but once it exceeds  $O'O$  it is saved. An income tax shifts  $ab$  to  $cb$ , and let us assume that the individual chooses to be at the point I on this post-tax possibility line. It is now a simple matter to construct the possibility line resulting from an equal-

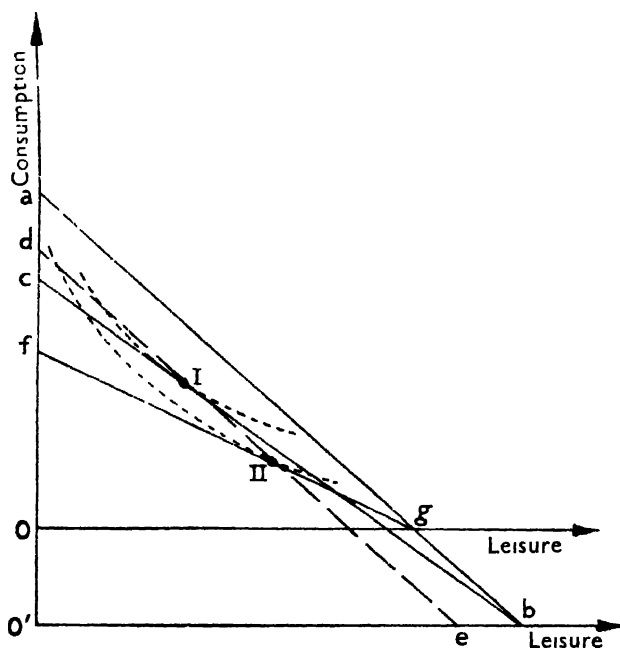


Figure 4.3

yield expenditure tax, for with consumption fixed it is equivalent to a lump sum tax. Thus, in figure 4.2 the expenditure tax line is  $de$  (parallel to  $ab$ , through  $I$ ), and on this line the chosen point will obviously be somewhere between  $I$  and  $d$ , for instance at  $II$ . Thus, in these conditions, the expenditure tax will lead to more saving and more work (less leisure) than will an income tax of equal yield, and the individual will feel better off under the former than under the latter.

In figure 4.3 saving is the constant term (at a level of  $OO$ ), and again, as leisure is given up and income earned, first of all (between  $h$  and  $g$ ) it goes to finance saving but thereafter it is spent on consumption (i.e. above the horizontal axis from  $O$ ). The income tax shifts  $ab$  to  $ch$  as before, and we will assume again that the chosen point on  $ch$  is  $I$ . The line  $de$  can then be constructed to show all the points at which the tax yield from this individual is the same as at  $I$ , and the position chosen under the expenditure tax must consequently lie somewhere on this line. But this line  $de$  is not itself the opportunity line confronting the individual when an expenditure tax is imposed for he does not become liable to tax until he makes consumption expenditures, and these do not commence until his income line  $ab$  reaches  $r$ . A simple proportional expenditure tax will therefore shift his opportunity line to some such position as  $fg$ , leaving the segment  $zh$  of  $ab$  unaffected. Clearly, from the way in which successive indifference curves intersect  $de$  the point on it at which a straight line from  $z$  (such as  $lz$ ) will be tangential to an indifference curve, must lie somewhere below the point  $I$  (e.g. at  $II$ ) in figure 4.3. Hence we may conclude, within the assumptions we are at present making, that the expenditure tax will lead to less consumption and less work (more leisure) than in income tax of equal yield, and that the individual will feel worse off under the former than under the latter.

We can now tabulate the results we have achieved with the two-variables-at-a-time analysis as follows:

<i>Leisure highest under</i>	<i>Consumption highest under</i>	<i>Saving highest under</i>	<i>Welfare highest under</i>	<i>Source</i>
1 (FIXED)	Income tax	Expenditure tax	Expenditure tax	Figure 3.2
2 Income tax	(FIXED)	Expenditure tax	Expenditure tax	Figure 4.2
3 Expenditure tax	Income tax	(FIXED)	Income tax	Figure 4.3

It will be seen from the table that the relative disincentive effects of the two taxes depend on whether it is consumption or saving that is held constant as income rises.

But 'two-variables-at-a-time' is not only an artificial constraint, but in this case also an unhelpful one. Moreover, it has the effect of limiting the validity of the equal-yield condition by imposing limitations on the scope the individual has for adjusting to the tax changes. So the time has come to extend the analysis so as to allow all three main variables to change simultaneously. This will involve introducing a third dimension into the geometry with some consequent visual complications, but the method of analysis is nevertheless essentially similar to that employed so far. In fact, the two-variable analysis can be extracted from the three-variable analysis, as will be seen in due course, since the former is but a special case contained within the latter.

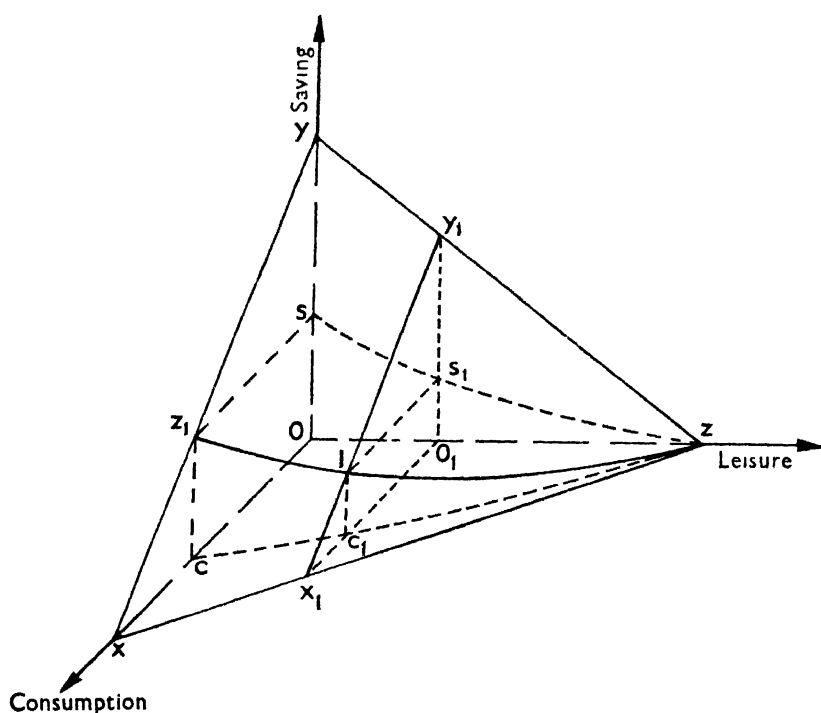


Figure 4.4

## (B) A THREE-VARIABLE ANALYSIS

On the three axes of figure 4.4 are represented the three important variables we are interested in, viz. consumption, leisure and saving. If an individual is thought of as starting at the point  $z$ , where he does no work (i.e. has the maximum amount of leisure) and consequently earns no income with which to save or buy consumption goods, he can give up some of this leisure (i.e. move from  $z$  towards  $O$ ) and as he does so he acquires income which he can distribute between consumption and saving as he wishes. A movement along  $zy$  would mean that the whole of this income is saved, while a movement along  $zx$  would mean that the whole of income is spent on consumption, while the more likely case where some income is used for each is represented by a movement to an intermediate position somewhere on the surface of the possibility plane  $xyz$ . A whole series of such hypothetically chosen points, one for each level of income (i.e. for each amount of leisure taken) is shown by the line  $zz_1$ , which indicates that for the individual in question the proportion of his income

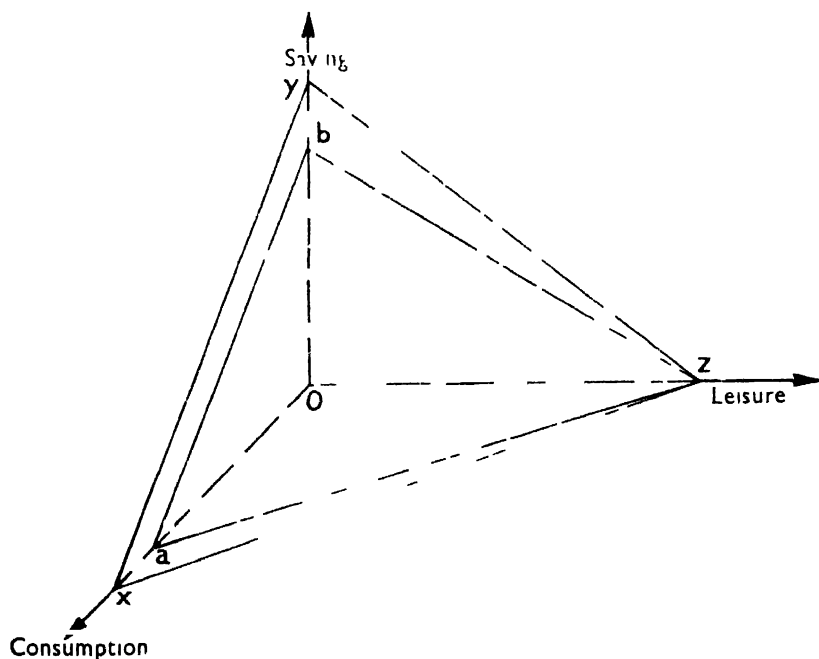


Figure 4.5







to the amount of income that could be earned by giving up  $zg$  of leisure.

We will now mix these ingredients together. First, we will impose the income tax, as in figure 4.5, and suppose that on the resulting possibility plane ( $abz$ ) the individual chooses some point such as II in figure 4.8, which means that he takes  $OO_1$  of leisure, and with the income he earns by sacrificing  $O_1z$  of leisure he buys  $O_1c_1$  of consumption goods, and saves  $O_1s_1$ . These readings are obtained by

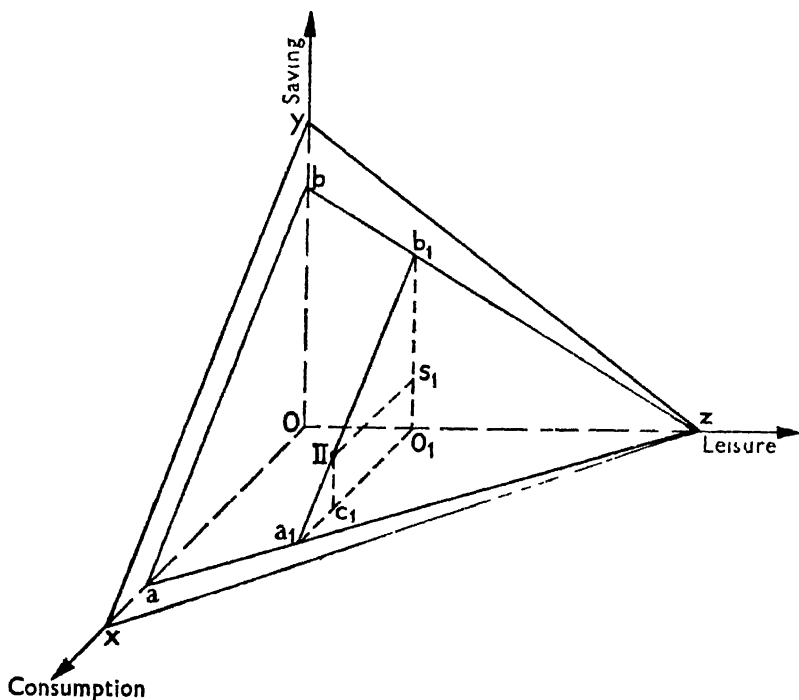


Figure 4.8

constructing the cross-section plane ( $O_1a_1b_1$ ) through II parallel to  $Oxy$ . Secondly, we have to introduce the equal-gield condition, i.e. indicate all the points at which the tax yield would be the same as at II. This involves constructing a plane such as  $efg$  in figure 4.7, which will pass through the point II. Since all points on  $a_1b_1$  in figure 4.8 would in fact give the same tax yield as the point II (since all involve the earning of the same income, the amount of leisure taken

being the same at  $O_1$  in all cases), then the whole of the line  $a_1b_1$  will lie on this equal tax plane, as indicated in figure 4.9.

Thirdly, when we introduce a direct expenditure tax, we find that the possibility plane so generated would intersect an equal-tax yield plane in the characteristic way shown in figure 4.10. The problem then is to find the point on some such line as  $v_1z_1$  (the locus

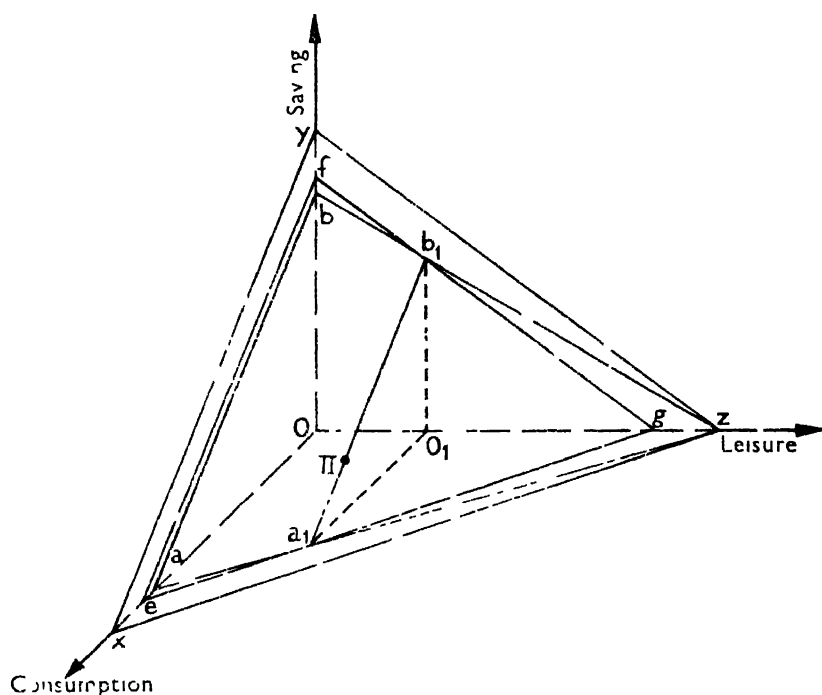


Figure 4.9

of all points at which the expenditure tax in question gives the required tax yield) which will be chosen by the individual in question (if the expenditure tax were substituted for the income tax with which he chose to be at II). It is thus a matter of varying the expenditure tax so as to slide  $v_1z_1$  across the surface of  $cfg$  until the individual is led to choose some point on such a line, whereupon the conditions are satisfied for the analysis to proceed.

In figure 4.11 the relevant information is abstracted and combined in a single diagram. The labelling is identical to that used in figures 4.5 to 4.10, and these earlier figures should be referred to for clari-

fication where necessary. There is also some additional information, however, which will be explained before the results of the analysis are examined. The line  $qz$  is the intersection of the two post-tax possibility planes,  $aqz$  being part of the income tax plane, and  $yqz$  part of the expenditure tax plane. The line  $a_1p$  is the locus of all points (such as  $II$  in figures 4.8 and 4.9) which are possible optimum points under the income tax yielding the given amount of tax, and  $pb_1$  is its extension across that part of the income tax plane which lies below the expenditure tax plane. Similarly  $y_1p$  is the locus of

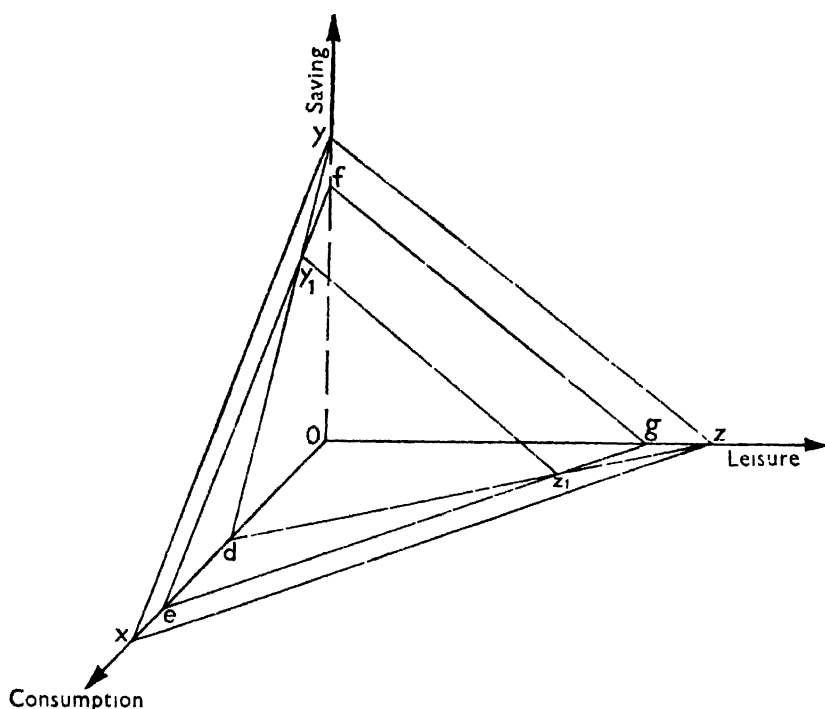


Figure 4.10

possible optimum points under the expenditure tax which would yield the required tax revenue, and  $pz_1$  is its extension across that part of the expenditure tax plane which lies below the income tax plane. In the general argument which follows, the point  $p$  itself is to be excluded from the range of points of which it is the terminal

point (as in  $a_1p$ ,  $pb_1$ ,  $v_1p$ , and  $pz_1$  above), for it constitutes a special case that will be dealt with separately in due course.

The point II which we earlier assumed would have been chosen under the income tax (see figure 4.8) would, in figure 4.11, lie in the range  $a_1p$ , and for our present purposes it does not matter much where it lies within this range. In order to make our analysis as general as possible, it will be convenient not to specify the chosen points precisely, but to consider various possible ranges within which they might lie, and then to consider the distinct cases that arise in this way. Thus points such as II in figure 4.8 will be designated 'Range I' under the income tax, this range comprising all the points along  $a_1p$ . Possible optimum points under the income tax which lie in the range  $pb_1$  will similarly be designated 'Range II' under the income tax. For the expenditure tax, the two ranges within which the possible optimum points may lie are  $v_1p$  (Range I) and  $pz_1$  (Range II). It should be borne in mind that the point  $p$  itself is excluded in each case.

The next task is to compare the various cases by combining each possible range of outcome under the one tax with each of the alternatives under the other, giving four distinct combinations in all. These will be worked through systematically in turn. The first case is the one where the chosen point under the income tax falls in Range I (i.e.  $a_1p$ ) and that under the expenditure tax does so too (i.e.  $v_1p$ ). What we want to assess are the implications of these choices for the relative welfare, consumption, saving and leisure enjoyed by the individual. From figure 4.11 it will be seen that when he was confronted with the income tax (i.e. his possibility plane was  $abz$ ) the possibilities represented by  $v_1p$  were not available to him, lying outside this plane. Hence his choice of some point along  $a_1p$  in this situation does not necessarily mean that he would still have chosen that point if he had had the opportunity of being on  $v_1p$ . Similarly, when confronted with the expenditure tax, his possibility plane was  $d/vz$ , and consequently he had no opportunity of choosing any point on  $a_1p$ , since these all lie outside that plane. Hence his choice of some point on  $v_1p$  in this situation implies nothing concerning the relative merits of that point and the points in the income tax range  $a_1p$ . There is therefore nothing we can say *a priori* about the relative welfare enjoyed under these two ranges, the income tax may be superior to the expenditure tax, or vice versa, or the individual may even be indifferent between them, it will depend on the particular structure of his preferences. When we consider consumption, however, we can be more definite, for it is quite obvious that all points on  $a_1p$  in-

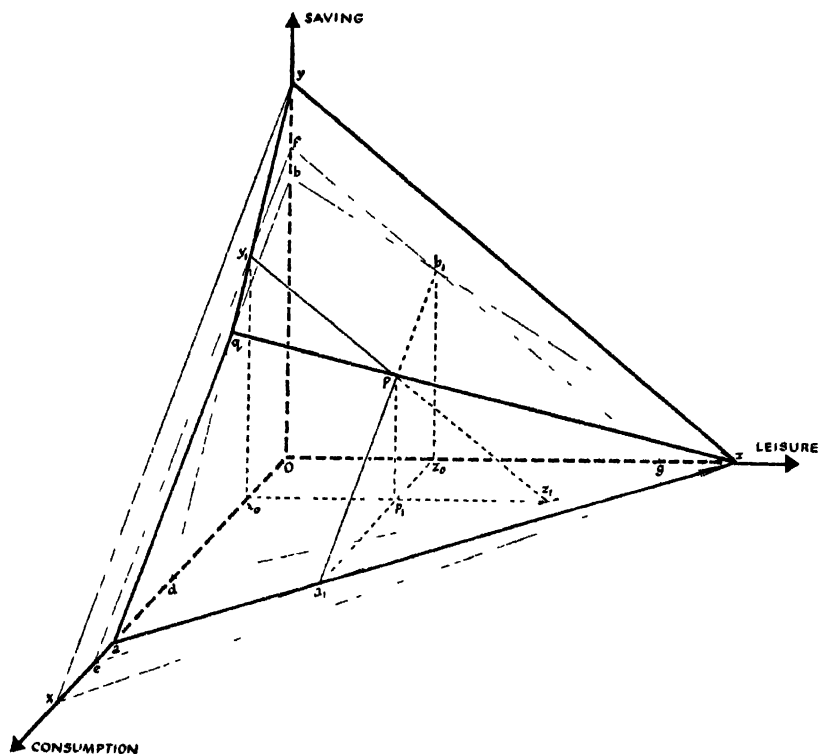


Figure 4.11

volve a higher level of consumption than any point on  $y_1p$ , for the level of consumption for every point in the latter range is the same,  $Ox_0$  ( $z_0p_1$ ), while consumption along  $a_1p$  is greater than  $z_0p_1$  at all points. Hence we may conclude that consumption will in this case be higher under the income tax than under the expenditure tax. When we consider leisure, similar reasoning will show that all points on  $y_1p$  involve less leisure than any point on  $a_1p$ , for on the latter the amount of leisure is constant (at  $Oz_0 - x_0p_1$ ), while all points on  $y_1p$  involve less leisure than this. We conclude therefore that leisure will in this case be highest under the income tax. Finally, with respect to saving, it is obvious that  $y_1p$  implies a higher level of saving than does  $a_1p$ , for all points on the former are higher than  $p$ , while all points on the latter are lower. The expenditure tax therefore leads to more saving in this case than does the income tax. These results may be tabulated as follows:—

*Case I*—Welfare—no definite conclusion possible.

Consumption highest under the Income tax.

Leisure highest under the Income tax.

Saving highest under the Expenditure tax.

Turning now to the second case, where the income tax optimum is still in the range  $a_1p$ , but the expenditure tax optimum is in Range II (i.e.  $pz_1$ ), we can conduct a similar analysis. On general welfare grounds it is clear that in this case the income tax is preferable, for the points in the range  $pz_1$  were available to the individual (since they lie below the plane  $abz$ ) when he in fact chose to be somewhere on  $a_1p$ , hence the latter must be preferable to the former. As regards consumption, there is no change in our conclusions from last time, for  $pz_1$  implies precisely the same amount of consumption ( $Ox_0$ ) as did the range  $y_1p$ , so that consumption is still highest under the income tax. In the case of leisure, the previous conclusion is reversed, for now all points along  $pz_1$  imply a greater amount of leisure than  $Oz_0$ , hence leisure will be highest under the expenditure tax. Finally, with regard to saving, no definite conclusion can be drawn, for both  $a_1p$  and  $pz_1$  allow for saving to vary within the range  $p_1p$ , and to draw a definite conclusion we need to know the actual points chosen in each range. In summary, we find:—

*Case II*—Welfare highest under the Income tax

Consumption highest under the Income tax.

Leisure highest under the Expenditure tax

Savings—no definite conclusion possible.

Case III, where the income tax optimum is in Range II ( $pb_1$ ) and the expenditure tax optimum in Range I ( $y_1p$ ) will not be analysed in detail, since the argument runs along the same lines as it did in Case II, of which it is the obverse case. Case IV can be dismissed even more summarily, since it is logically impossible! The choice of some point on  $pb_1$  under the income tax would have been made when the various possibilities indicated by  $pz_1$  were also in fact available to the individual (since they lie below the plane  $abz$ ), so that it can be deduced that  $pb_1$  is preferable to  $pz_1$ . But, conversely, the choice of some point on  $pz_1$  under the expenditure tax must have been made when the possibilities indicated by  $pb_1$  were in fact also available (since they lie below the plane  $aby$ ), so that it can be deduced that  $pz_1$  is preferable to  $pb_1$ . This is clearly nonsense, for two points cannot rationally each be preferred simultaneously to the other, so Case IV can be dismissed as impossible.

It remains only to deal with the special case of the point  $p$ . The first thing to note here is that this point can only be chosen under one tax at a time, not under both simultaneously, for if an indifference surface is tangential to the one tax plane at this point (and this is what is meant by it being a chosen point), then the other tax plane will intersect it and cause some preferable point to be chosen elsewhere. More specifically, if  $p$  is the chosen point with the income tax, then the expenditure tax optimum will lie somewhere along  $y_1p$ , and this latter point will be better than  $p$  on general welfare grounds, involving the same amount of consumption, less leisure, and more saving. On the other hand, if  $p$  is the chosen point under the expenditure tax, the income tax optimum will lie along  $a_1p$ , and the latter will be preferred, involving more consumption, the same amount of leisure, and less saving than at  $p$ .

Our general results can therefore be tabulated as follows:

	CASE I	CASE II	CASE III
Welfare highest under	?	Income tax	Expenditure tax
Consumption highest under	Income tax	Income tax	Expenditure tax
Leisure highest under	Income tax	Expenditure tax	Income tax
Saving highest under	Expenditure tax	?	?

The main thing to note here is the general inconclusiveness of the theoretical results, which means that it is necessary to keep an open mind concerning the relative effects of these two taxes in any individual case. However, there is an alternative formulation of the results which may help to shed a little more light on the situation.

In figure 4.12 is shown the equal tax yield plane,  $efg$ . The point  $i$  thereon represents whatever point is chosen by the individual under the income tax, and let us assume that we do not know any more about it than this (i.e. we do not know whether it lies in Range I or Range II). Across the surface of  $efg$  we now draw three lines, each passing through  $i$ , the first,  $cc'$ , representing all points on  $efg$  at which consumption is the same as at  $i$ , the second,  $ll'$ , representing all points at which leisure is the same as at  $i$ , and the third,  $ss'$ , representing all points at which saving is the same as at  $i$ . This divides the surface of  $efg$  into six segments, and we can identify the respective cases analysed above by noting into which of these segments the individual moves when the income tax is replaced by the expenditure tax of equal yield.

Firstly, if the expenditure tax leads to more saving, but less leisure and less consumption (i.e. if the expenditure tax optimum point





welfare conclusions. The only pattern of reactions that would establish definite welfare superiority for the expenditure tax would be that involving less leisure and more consumption (Case III).

Thus the three-variable analysis makes possible a fuller and richer analysis of the implications of the two taxes, although there are still some significant limitations that must not be passed over without comment. The most important of these is that what we have been conducting has been a one-period analysis, and this is a severe shortcoming when one of our main variables is saving. Our assumption that the expenditure tax does not affect saving, and that the income tax does so in an essentially symmetrical way to that in which it affects consumption, does not square strictly with our earlier two-period analysis (at the beginning of section (A) of this chapter) where the expenditure tax was levied not only on present consumption but also on future consumption out of present saving, and where the 'double taxation of saving' under an income tax was also allowed for. This defect, though serious, is not fatal however, so long as saving is affected more by the income tax than by the expenditure tax, for then the two tax planes will still intersect in the characteristic way shown in figure 4.11, and although to be strictly correct the analysis has to become a great deal more complex (so much so that it cannot be handled diagrammatically) the essential points emerging from our more simplified analysis remain valid.

## CHAPTER FIVE

### Taxes on Personal Wealth

There are three kinds of direct tax on personal wealth that are worth distinguishing conceptually for purposes of the present analysis. The first is an unforeseen, once-for-all tax; the second a regularly recurring tax; and the third a foreseen but sporadic tax. Typical examples of each are respectively a capital levy, an annual tax on net worth, and death duties.

The capital levy, provided that it really *is* unforeseen and is *not* expected to recur, is easily dealt with, for it can have no effects on behaviour before its imposition, and the only subsequent effects upon the individual will be those brought about by the removal from personal disposition of the actual tax revenue itself. It is, therefore, essentially a lump-sum tax, and requires no special treatment here beyond that conducted in Chapter II earlier.

The other two direct taxes on personal wealth do present some new problems, however, and it is to these that this chapter is devoted. Where they are still essentially lump-sum taxes (e.g. in their effects upon risk-taking) they will not be analysed explicitly. The annual capital tax will be treated first, and death duties subsequently. In connection with death duties, it will be assumed that they are a tax on the total estate of the individual, and not levied according to the individual bequests or related in any way to the status of the beneficiaries. For simplicity's sake, both taxes will be assumed to be simple proportional taxes, and problems associated with progression, definition of the tax base, etc., will not be considered. With the earlier analysis in mind, it will not be difficult to allow for these complications, but to go into them all in detail here would carry us too far from the main analysis.

#### (A) A RECURRING CAPITAL TAX

##### (i) A TWO-PERIOD ANALYSIS

The first problem to be confronted here is that of decisions to spend vs. save. In figure 3.2 above a two-period analysis of the saving

decision with a given income was conducted for a lump-sum tax and income tax, and at the beginning of section (A) of Chapter IV it was pointed out that an expenditure tax was also a lump-sum tax in this respect. This same kind of analysis can also be extended to cover the case of the recurring capital tax. In a two-period analysis, of course, such a tax can in fact only be levied once (between period 1 and period 2) but the result can be generalized, and will be extended to the three-period case later in this chapter.

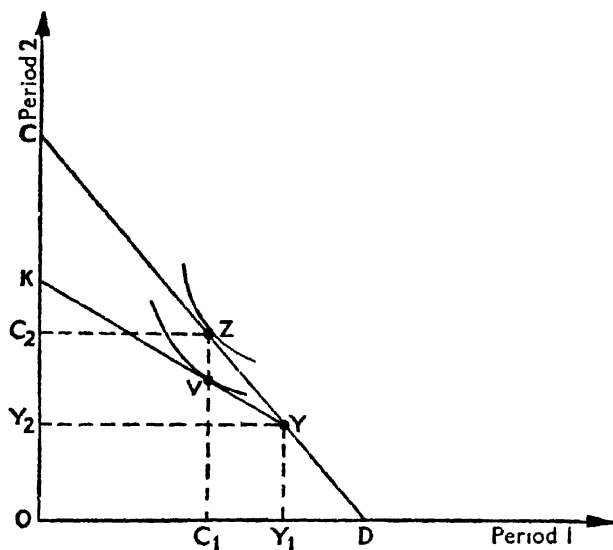


Figure 5.1

In figure 5.1,  $CD$  is the possibility line (including the effects of interest payments and receipts) confronting the individual with an expected total income of  $Y$  (i.e.  $OY_1$  in period 1 and  $OY_2$  in period 2). The imposition of the capital tax has the effect of taxing any resources that he saves and tries to carry forward in time (from period 1 to period 2), but it does not affect any borrowing he does against his future income in order to augment his consumption in period 1. (It is being assumed, as before, that all income is consumed over the two periods taken together.) Thus if a consumption pattern had been chosen such as  $Z$  (on  $CD$ ) in figure 5.1, this involved saving ( $C_1Y_1$ ) to add to the next period's income ( $OY_2$ ) thus enabling consumption in that period to rise (to  $OC_2$ ). But this saving will now

be taxed, so that the actual possibility line in this segment is no longer  $CY$  but, say,  $KY$ , where  $K$  will be nearer  $Y$ , the greater the rate of the capital tax. (Note that the capital tax is actually a tax on *accumulated* net worth, not, as it appears to be here, on current saving. With a two period analysis and no initial capital, the two cases resolve themselves into the same thing. A more realistic analysis

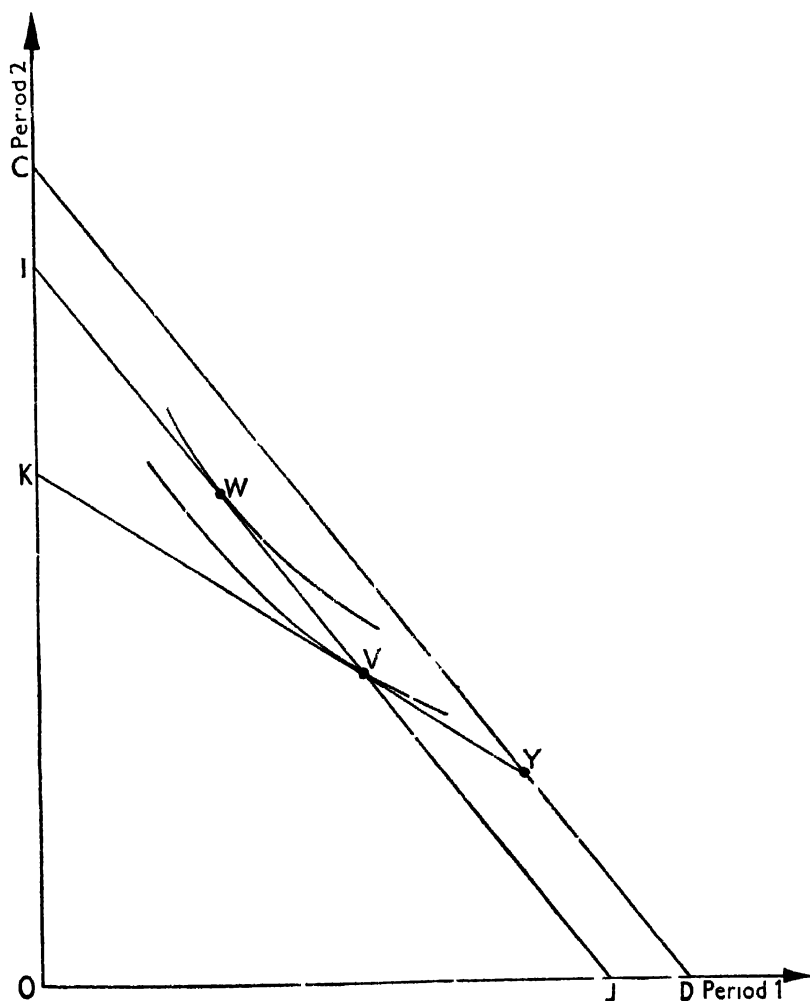


Figure 5.2

will be presented shortly in the three-period model.) If, on the other hand,  $Z$  had not been as shown, but somewhere along the segment  $YD$ , then of course no capital tax would have been payable by this individual. However, returning to the originally assumed  $Z$ , let us assume that the point chosen on the new (kinked) possibility line ( $KYD$ ) under the capital tax is  $V$  in figure 5.1. This particular point represents the case where the individual saves exactly the same amount after the imposition of the tax as he did beforehand, but it does not now enable him to augment his second period's consumption to  $C_1Z$ , as before, but only to  $C_1V$ , the difference  $VZ$  being the amount he pays in tax. In general, the point  $V$  could be anywhere on  $KY$ , so that no definite conclusion can be drawn *a priori* as to whether a capital tax of this sort will lead to more or less saving as compared with the pre-tax position.

We can now compare this outcome with those that would arise under an income tax and under an expenditure tax each of which yields the same amount in tax from the individual in question. This is done in figure 5.2. The line  $IJ$  is drawn through  $V$  (see figure 5.1) parallel to  $CD$ , so that it is both the equal-tax-yield line and the expenditure tax line. The point chosen on this is  $W$ , which is preferable to  $V$ , and leads to more saving than at  $V$ . This is an inescapable conclusion within the terms of our analysis. By analogy with the analysis conducted earlier on the basis of figure 3.2, it can be shown that an income tax will bring the individual to some intermediate point between  $V$  and  $W$ . We have therefore established within the present theoretical framework that saving will be reduced more (or increase less) under a recurring capital tax than under an income tax of the same yield, while under an expenditure tax of the same yield saving will be reduced still less (or increase still more).

## (ii) A THREE-PERIOD ANALYSIS

The analysis can now be extended to take a third period into account, with a welcome increase in realism but at a cost of increasing complexity. In order to keep the complexity to a minimum it will be assumed that the interest rate is zero. This will not affect our results in any essential way, but it does mean that there is no longer any sensible distinction to be drawn in this analysis between an income tax and an expenditure tax, so in this section the two terms are effectively synonymous.

In figure 5.3 the initial possibilities are represented by the plane  $ABC$ , where the distances  $OA$ ,  $OB$  and  $OC$  are each equal to the total income expected over the three periods, the actual time distri-

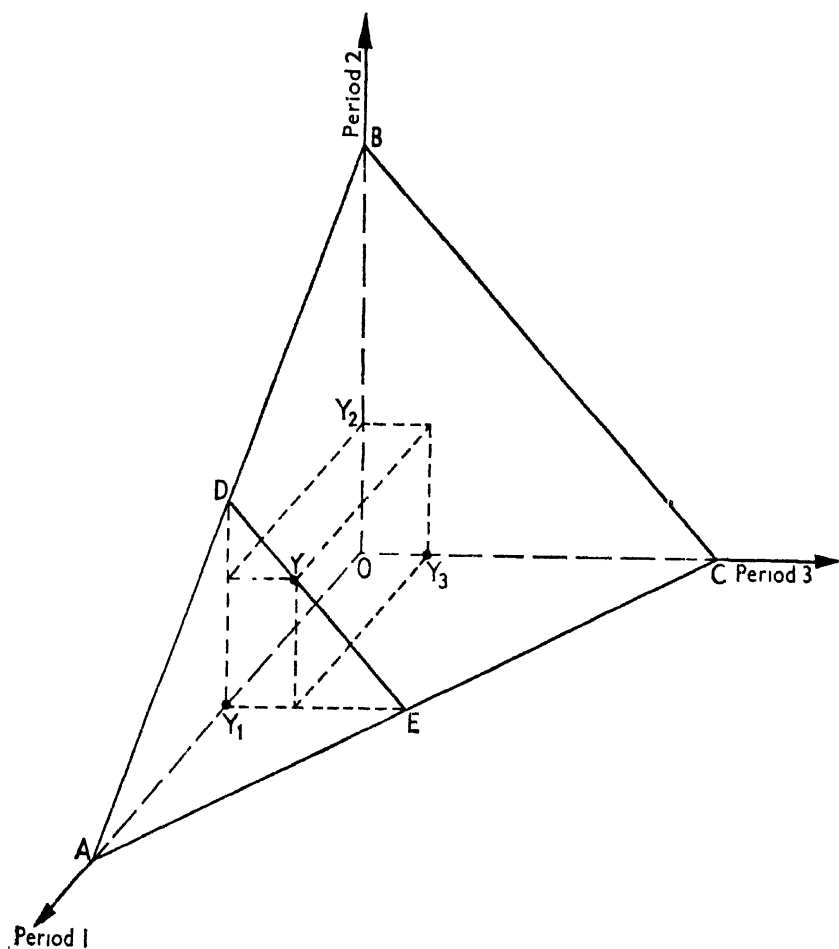


Figure 5.3

bution of this income being represented by the point  $Y$  (whose coordinates are  $OY_1$ ,  $OY_2$  and  $OY_3$ ). Any time-pattern of consumption other than that indicated by the point  $Y$  itself, will therefore require some shifting of resources through time. As we have already seen in the two-period case, the capital tax will fall only on shifts in one direction, namely when resources are saved for future use, it does not affect future resources brought forward for present use. We will therefore consider the effects of the capital tax on the

possibility plane  $ABC$  in two stages: firstly, any tax that is levied on resources transferred from period 1 to period 2; and secondly, any further tax that is levied on resources transferred from period 2 to period 3.

The line  $DE$  through  $Y$  in figure 5.3 divides the surface of  $ABC$  into two areas. If the chosen consumption pattern falls in the section  $ADE$  then resources have to be transferred from the future for use in period 1, for the individual is trying to maintain a level of consumption in period 1 greater than the income ( $OY_1$ ) he expects in that period. In that case no capital tax is payable at the end of period

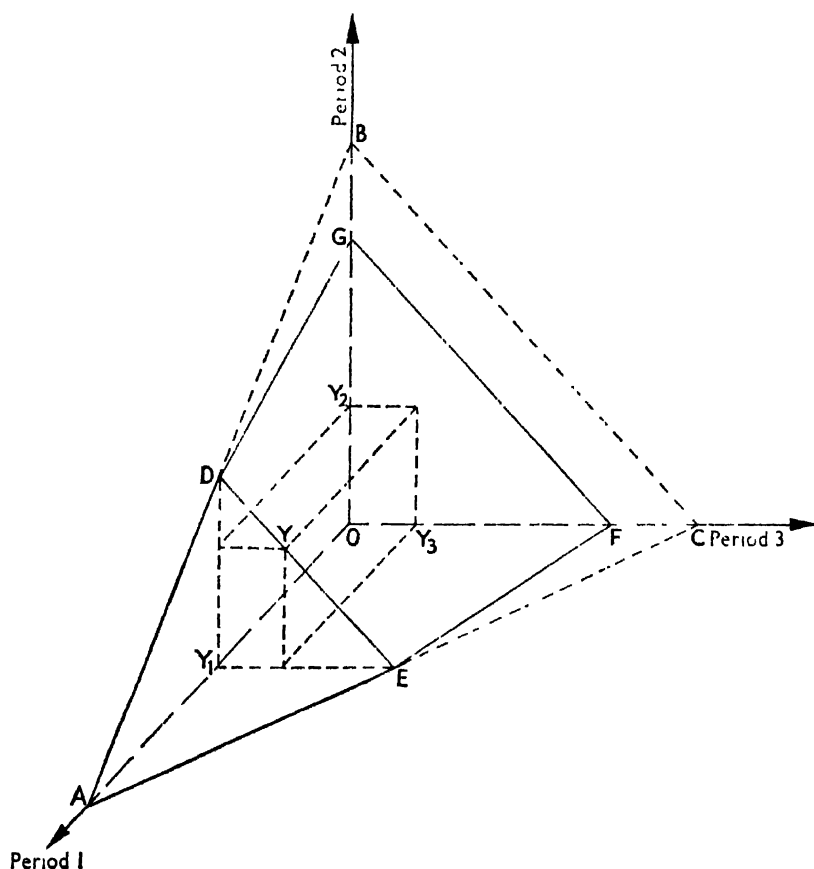


Figure 5.4



1. On the other hand, if the chosen consumption pattern falls in the section  $BCED$ , then not all of period 1's income ( $OY_1$ ) will be consumed in that period, and some capital will therefore be carried forward to period 2, and some capital tax will therefore be levied. This will have the effect of rotating the plane section  $BCID$  downwards as if hinged along  $DL$ , to some such position as  $DLIG$  in figure 5.4. This indicates that the further the individual moves from  $DL$ , the greater the amount of resources he is trying to transfer, and hence the greater the tax payment (i.e. the more  $DEFG$  diverges from  $BCID$ ). Note that the kinked line  $IDG$  in the  $OAB$  plane corresponds roughly to  $DYK$  in figure 5.2, remembering, of course, that there was a positive interest rate there as against a zero one here.

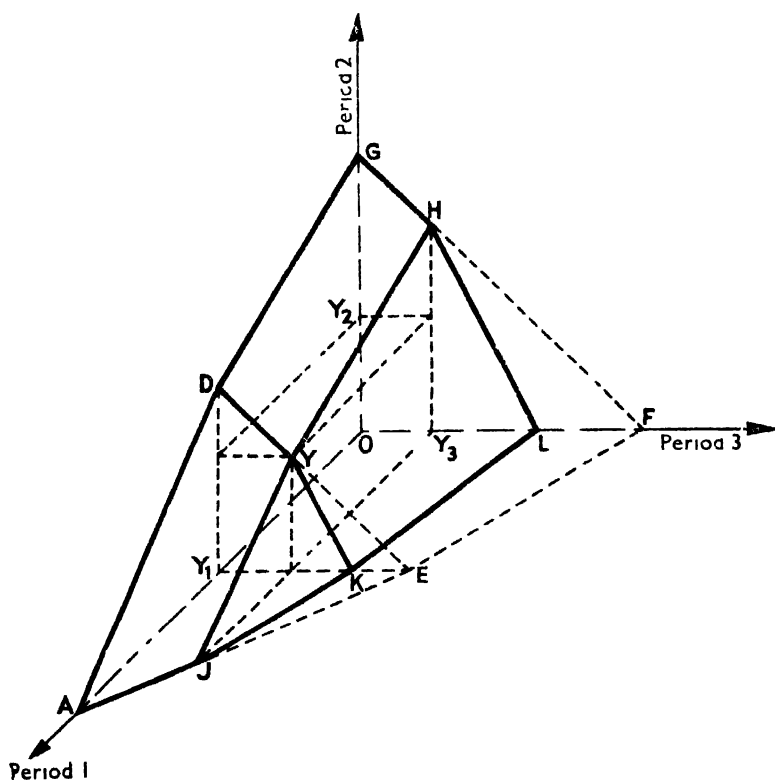


Figure 5 5

We now come to the second stage, the levying of the capital tax on resources transferred from period 2 to period 3. For any level of consumption in period 3 which is not greater than  $OY_3$ , no transfer of resources from period 2 to period 3 would be necessary. In terms of figure 5.5, this means that if the chosen consumption pattern is in the area  $ADGHYJ$ , there will be no further transfers beyond those already incorporated in the surface  $ADGFE$  (see figure 5.4), so that the tax will have no effect upon this part of the opportunity surface. If the chosen consumption pattern lies elsewhere, however, transfers from period 2 to period 3 will have to take place, and the capital tax will therefore be levied again. The effect of this on the opportunity surface will again be to rotate it downwards, this time as if hinged along  $HY$  and  $YJ$ , so that its two new facets will be  $HYKL$  and  $YJK$  on figure 5.5.

The eventual opportunity surface after the imposition of the capital tax will therefore be a complex one consisting of four plane facets with a single common point at  $Y$ . Each of these facets has a common-sense interpretation as follows: firstly,  $ADYJ$  represents the area of choice where no capital tax at all is levied (and it is, therefore, part of the pre-tax possibility surface  $ABC$ ); secondly,  $DGHHY$  represents those consumption choices where the tax is levied only once, namely on transfers from period 1 to period 2; thirdly,  $JYK$  represents the other set of consumption choices where the tax is levied only once, but this time on transfers from period 2 to period 3; finally,  $HYKL$  represents those consumption choices involving the payment of capital tax twice, for they require both a transfer of resources from period 1 to period 2 and from period 2 to period 3.

One notable feature of this capital tax opportunity surface is that it has distinct 'ridges' meeting in a 'peak' at  $Y$ . In the most general terms, this means that wherever the originally chosen point was (on  $ABC$ ) it will probably move closer to  $Y$  after the imposition of the tax (unless, of course, it was on the no-tax facet  $ADYJ$  in which case it is unaffected). This means that the chosen pattern of consumption will tend to conform more closely to the initial time-distribution of income, and saving will consequently decline. None of this is really surprising of course.

However, some much less obvious results than that can be derived from this model. For instance, let us compare this recurring capital tax with an expenditure tax of the same yield. We will assume that on the capital tax opportunity surface some point is chosen which yields a tax revenue of  $AP$  ( $= BQ - CR$ ) in figure 5.6. If we plot the intersection of this constant-tax-yield plane with the capital tax

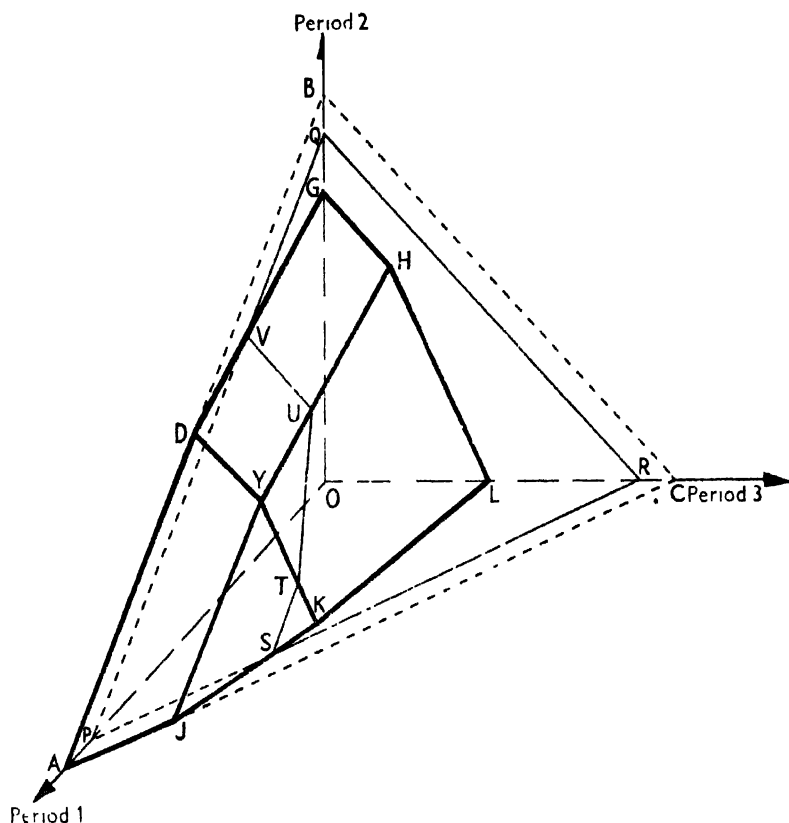


Figure 6

opportunity surface, we find that they intersect along the kinked line *STUV*, and our initially assumed optimum point under the capital tax could be anywhere on this line. It will be clear from earlier analyses that this constant-tax-yield plane will also be the expenditure tax plane for an expenditure tax of equal yield. From this we can deduce that an individual will be better off under an expenditure tax than under a recurring capital tax of equal yield, since the expenditure tax plane intersects the capital tax surface at the point where the latter is tangential to an indifference surface, so that the expenditure tax plane must itself be tangential to some higher indifference surface (by analogy with the earlier reasoning within the two-period analysis).



First let us compare the recurring capital tax with an expenditure tax of equal yield. The relevant information is set out in figure 5.8, where the new elements not already in figure 5.7 are the expenditure tax plane  $lzy$ , the intersection of the two tax planes  $sz$ , and the intersection of the expenditure tax plane with the constant tax yield plane  $y_1z_1$ . As with the earlier analysis (see figure 4.11) we shall divide the possible optimum points under each tax into two critical ranges.

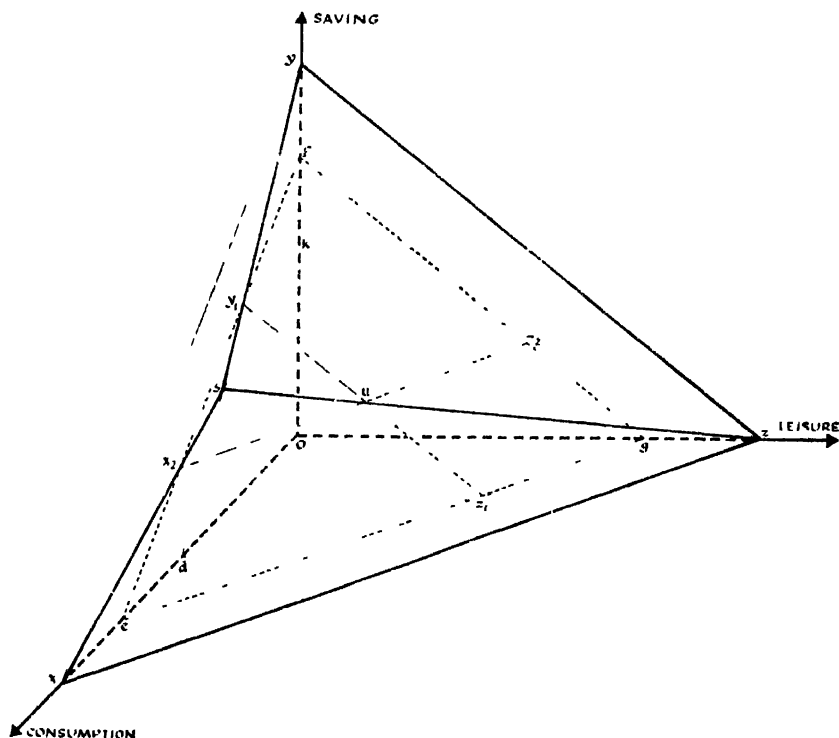


Figure 5.8

For the expenditure tax, Range I will be  $y_1u$  and Range II  $uz_1$ , while for the capital tax Range I will be  $x_2u$  and Range II  $uz_2$ . As before, the common point  $u$  is excluded from each range, and will be analysed separately in due course. All we have to do now therefore is to work through the three valid combinations of these possible ranges.

Case I is where the choice made under each tax is in its Range I. In this case no general welfare conclusion is possible, since for neither

tax were points in the other tax range available when the choice in question was being made. Since  $y_1u$  represents a given level of consumption, and  $x_2u$  is at all points greater than this, consumption must be higher under the capital tax. Conversely, with respect to saving,  $x_2u$  represents a given level which is exceeded by all points in the range  $y_1u$ , so saving will be higher under the expenditure tax. Finally, no definite conclusion is possible with respect to leisure, since both ranges include variations from zero (at  $x_2$  or  $y_1$ ) to an amount up to (but excluding)  $u$ .

Rather than repeat this analysis for Cases II and III, only the summary results will be given, and these can easily be checked by analogy with the reasoning associated with figure 4.11 in the preceding chapter. The analysis of the special case of the point  $u$  also follows the same pattern as before. It cannot be chosen under both taxes simultaneously. If  $u$  is the chosen point under the expenditure tax, then the capital tax optimum will lie somewhere along  $x_2u$  and will be better than  $u$ , entailing more consumption, less leisure and the same amount of saving as at  $u$ . Conversely, if  $u$  is chosen under the capital tax, then the expenditure tax optimum will lie along  $y_1u$  and will be preferable to  $u$ , entailing the same amount of consumption, less leisure and more saving than at  $u$ .

The general results are therefore as follows:

	CASE I	CASE II	CASE III
Welfare highest under	?	Capital tax	Expenditure tax
Consumption highest under	Capital tax	Capital tax	Expenditure tax
Leisure highest under	?	Expenditure tax	Capital tax
Saving highest under	Expenditure tax	Capital tax	Expenditure tax

Again there are no clear-cut conclusions to be drawn. However, the respective cases can be identified with the help of figure 4.12 once more, showing all the possible shifts that can occur (on the equal-yield-tax plane) when a capital tax is replaced by an expenditure tax. If the point chosen under the capital tax had been  $i$ , then any movement into the area  $cfs'i$  (i.e. any change involving more saving *and* less consumption) will be an instance of Case I; any movement into the area  $c'is'g$  (i.e. less saving *and* less consumption . . . and therefore more leisure) is an instance of Case II; and a movement into the area  $c'is$  (more saving *and* more consumption . . . and therefore less leisure) an instance of Case III. Only in this last case can we be sure that the change in question represents an improvement for the individual. In the first case it may or may not be, and in the

second case he will certainly be worse off in his new position under the expenditure tax. Note that no shifts occur into the area  $c'1e$ , which means that the substitution of an equal yield expenditure tax for a capital tax will never lead people to consume more *and* save less.

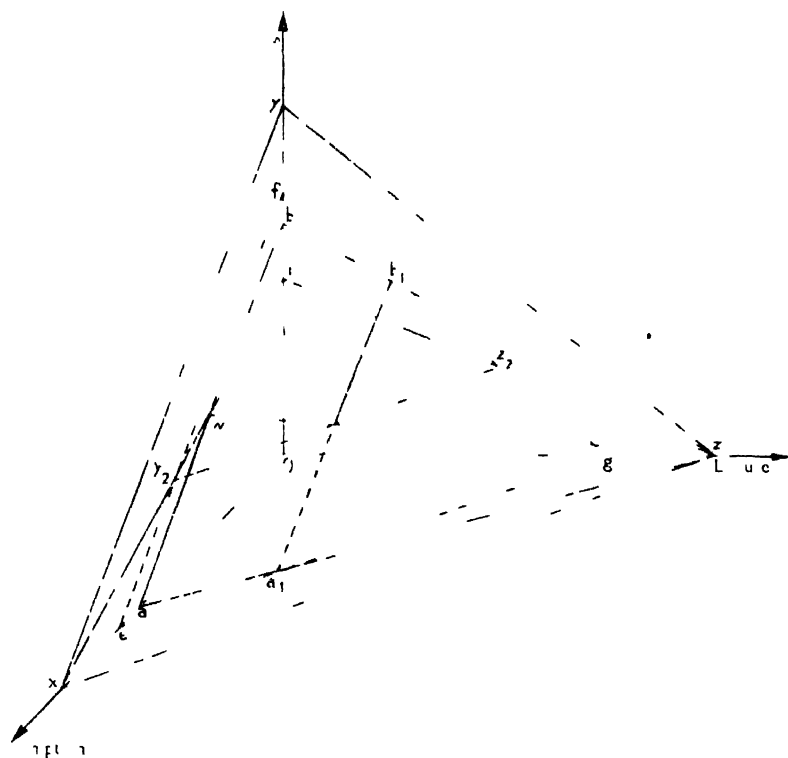


Figure 19

Finally let us compare the recurring capital tax with an income tax of equal yield (see figure 5.9). It should not be necessary to repeat the argument in detail, for it follows what should by now be familiar lines. The results for the respective general cases are as follows.

	CASE I	CASE II	CASE III
Welfare highest under	?	Capital tax	Income tax
Consumption highest under			
Leisure highest under	Capital tax	'	?
Saving highest under	Income tax	Income tax	Capital tax
	Income tax	Capital tax	Income tax





have like a recurring capital tax in this context or else be entirely inoperative. It is more interesting to analyse the estate duty within the three-period model as used on the recurring capital tax in figure 5.6, with appropriate adjustment to meet this new case, of course. The main such adjustment is to regard periods 1 and 2 as being the two periods within the lifetime of the individual, and period 3 as coming after his death and in which he is providing not for his own consumption but for that of his heirs. He is therefore considered to have income accruing only during periods 1 and 2, but planning for consumption in all three periods. The impact of death duties upon him in such a case is shown in figure 5.10, where  $ABC$  represents his pre-tax possibilities of redistributing  $OY_1 + OY_2$  (which totals  $OA$  or  $OB$  or  $OC$ ) over various time-patterns of consumption. Any such redistribution between period 1 and period 2 (i.e. within his lifetime) are unaffected by the tax, but as soon as he tries to pass on resources to his heirs (i.e. transfer resources from period 2 to period 3) he will be taxed, and his possibility plane is then, say,  $ABM$ , where  $M$  will be closer to  $O$  the greater is the rate of estate duty. If we now introduce a constant-tax-yield plane,  $PQR$ , it will intersect the estate duty plane in some such way as that represented by the line  $WX$ . This enables us to conclude that an expenditure tax of equal yield will always be preferable to an estate duty (for  $PQR$  will also be the expenditure tax possibility plane, and since it will intersect the  $ABM$  plane at the point chosen under the estate duty, it will itself be tangential to a higher indifference surface than that attained on  $ABM$ ).

It is more interesting, however, to compare the estate duty with a recurring capital tax of equal yield. It will be assumed that this recurring capital tax will be levied both between period 1 and 2 and periods 2 and 3, whereas the estate duty will, of course, only be levied between periods 2 and 3. In figure 5.11 the relevant part of the capital tax possibility surface ( $AYIIIK$ ) is added to the information also set out in figure 5.10. Since  $Y_3$  is zero in the situation we are now considering, the part of the original capital tax surface in figure 5.6 which lay to the left of  $JH$  becomes irrelevant, and consequently, to maintain some sort of comparability with the earlier analyses, the point  $A$  in figure 5.11 has also been labelled ( $J$ ) since  $J$  is the point to which it corresponds in the earlier diagrams. The intersection of the two post-tax possibility surfaces is shown in figure 5.11 as  $YZ$ , and it will be seen that the intersections between these two surfaces and the constant tax yield plane ( $WX$  for the estate duty and  $STU$  for the recurring capital tax) intersect each other and  $YZ$  at  $N$ .



greater under the recurring capital tax than under the estate duty, since all points on  $STN$  have co-ordinates on the Period 3 axis that are greater than the co-ordinates on that axis of  $WX$ . In Case II we compare  $XN$  with  $NU$ , and find that the estate duty is preferred, and leads to larger bequests than does the recurring capital tax. Conversely, in Case II we compare  $STN$  and  $WN$ , and find that the recurring capital tax is better and leads to larger bequests than does the estate duty. Turning briefly to the special case where  $N$  is the chosen point under either tax, the result will be that the other tax is preferable. If  $N$  is the chosen point under the estate duty (i.e. on  $WX$ ) then bequests will be greater under the capital tax (the chosen point will be somewhere on  $STN$ ), but if  $N$  is chosen under the capital tax bequests will be the same under both taxes.

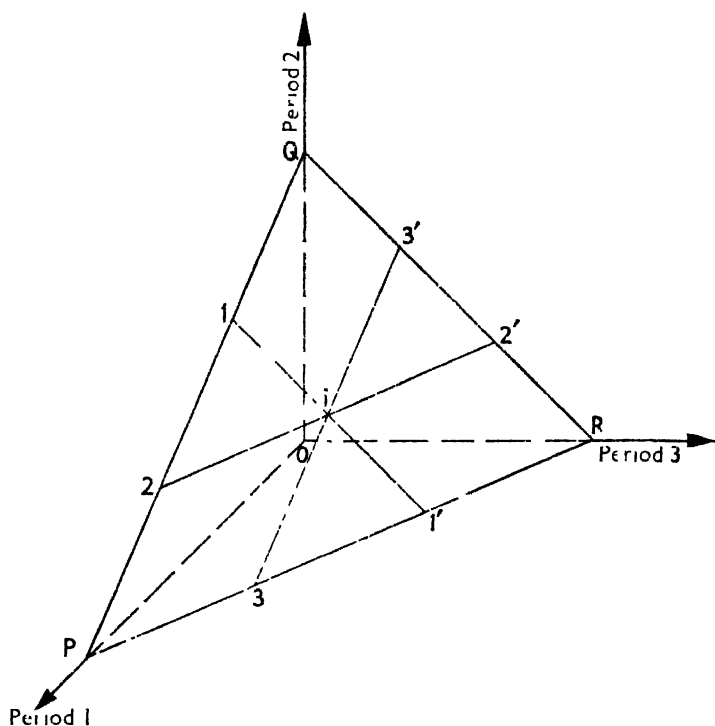


Figure 5.12

Thus we are once more presented with generally inconclusive results. Moreover, it is impossible in this case to set up 'reaction

criteria', as we have done in the past with the aid of figure 4.12 which will enable us to identify all of these cases unambiguously. In figure 5.12 the constant-tax-yield plane  $PQR$  is divided into six segments with a common point  $i$  as before. If  $i$  is the point chosen under the estate duty, and a recurring capital tax of equal yield is now substituted for it, then if the individual moves into the area  $PQ3'3$  (i.e. if he reduces his bequests), then this is quite unambiguously an instance of Case II. Similarly if the individual moves into the area  $i3'R'1$  (i.e. if he increases his bequests *and* reduces his own consumption in the first period) then this is clearly an instance of Case III and of nothing else. So far so good. The trouble comes with movements into the area  $i31'$  (i.e. increased bequests *and* increased own consumption in the first period), for although this would always happen under Case I, it might also happen under Case III (e.g. in figure 5.11 a movement from a point near  $H$  on  $WH$  to a point near  $S$  on  $STV$ ). Thus with reactions of this last type we could not be sure whether we were confronted with an instance of Case I or of Case III.

## CHAPTER SIX

### Direct Taxes on Persons

This chapter will comprise a few concluding remarks on one or two important aspects of the analysis as conducted so far that require further comment. We shall then leave the subject of the direct taxation of persons, and turn our attention to business taxes.

#### (A) COMBINATIONS OF TAXES

Up to now our analysis has always taken as its starting point a situation in which there were no taxes. In practice, however, the problem we are confronted with is usually one of assessing the effect of *varying an existing tax structure*. It is usually a matter of adjusting one tax out of a whole group of taxes that are being levied, i.e. of comparing one *combination of taxes* with another, rather than abandoning one *single tax* and substituting another. Fortunately, our analysis can be readily adapted to this purpose, however, as will be seen in this section. We shall confine ourselves here to one illustrative example, for it would require far too much space, time and effort to conduct a detailed comparative analysis of all the possible combinations of direct taxes that have been considered in the four preceding chapters. Moreover, this one illustrative problem incorporates most of the main points that are likely to arise in the other cases, so it will be a relatively simple matter to tackle them by analogy if this is desired.

Our illustrative problem is this: an income tax is already being levied, and we want to know what the relative effects would be on a given individual of reducing it and making up the lost revenue by introducing a capital tax. (This is essentially the same problem as the following: if an income tax is already being levied, compare the effects of (i) raising the income tax rate, with (ii) imposing a capital tax and leaving the income tax as it is.) We will use the three-variable analysis of consumption, leisure and saving as before, in fact our starting point will be the situation described in figure 4.9 above. The information required for the present problem is set out in figure 6.1. Here  $xyz$  is the no-tax possibility plane, and  $abz$  the existing possibility plane under the income tax at the initial rate. Let us assume

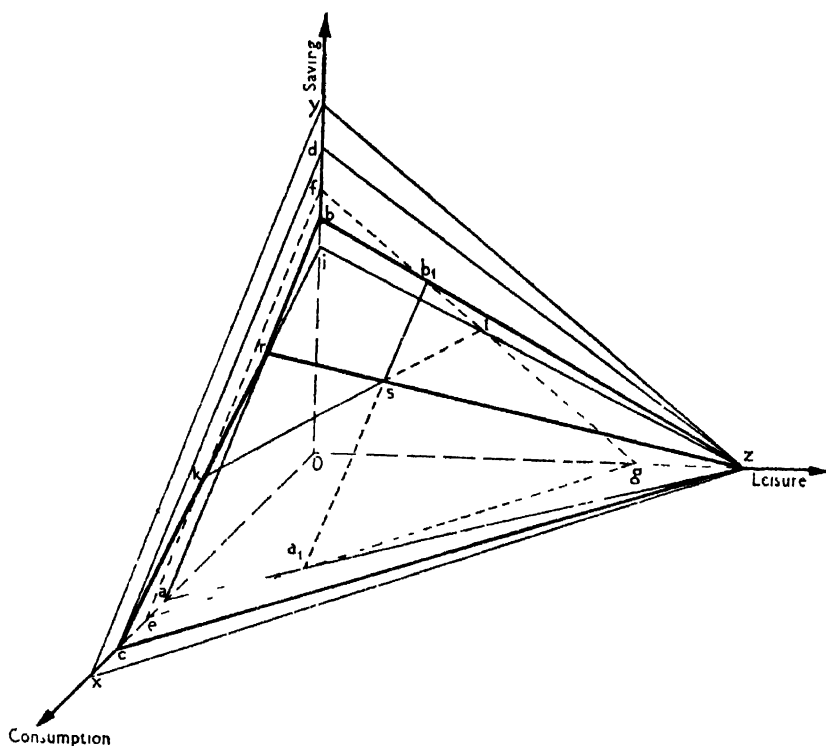


Figure 6.1

that on this plane the individual has chosen some point along  $a_1b_1$ , giving a tax yield of  $fy$ , for  $efg$  is the plane representing all the points at which the tax yield is the same as it is on  $a_1b_1$ . Now we are to compare this situation with one in which the income tax rate has been reduced (say to produce the possibility plane  $cdz$ ) and in which a capital tax has been superimposed upon this reduced rate of income tax in such a way as to restore the tax yield to its original level. The capital tax plane must therefore start from  $cdz$ , and will in fact provide some such opportunity plane as  $ciz$ , where  $i$  will be nearer to  $O$  the greater the rate of the capital tax. It is then  $ciz$  that has to be compared with  $abz$  (compare figure 5.9 for the corresponding case where there were no taxes initially). Thus  $rz$  is the intersection of these two planes, and  $kl$  and  $a_1b_1$  their respective intersections with the given-tax-yield plane  $efg$ . Again, the various possible chosen

points in each situation are classified thus: under the high-rate income tax Range I is  $b_1s$  and Range II  $sa_1$ , while under the capital tax plus low-rate income tax Range I is  $ks$  and Range II  $sl$ , the point  $s$  itself being excluded in each case. We can then analyse the various cases as before (Case I comparing the outcomes in Range I under each tax, Case II comparing an outcome in Range I under the high-rate income tax with one in Range II under the other, and Case III being the obverse of Case II) and the results are as follows:

	CASE I	CASE II	CASE III
Welfare highest under	?	Income tax	Income plus capital tax
Consumption highest under	Income plus capital tax	?	?
Leisure highest under	Income tax	Income plus capital tax	Income tax
Savings highest under	Income tax	)	

There is obviously much more uncertainty in these results than in previous ones, and this uncertainty is confirmed if one attempts to set out the 'reaction criteria' by which one would identify instances of these various cases. Thus, using figure 4.12 again, and treating  $i$  as the chosen point under the high-rate income tax, we would find that any shift (in response to the substitution of the capital tax for part of the income tax) involving the choice of more leisure would be an instance of Case II above. Similarly, any shift involving less leisure *and* more saving will be an instance of Case III. But a shift involving less leisure *and* less saving could be either Case I or Case III, and we cannot resolve this ambiguity by taking account of what is happening to consumption, for this may increase or decrease or remain the same in both cases.

In applying this type of analysis to other cases of this sort, or to more complex combinations, the main thing to watch is that the constant-tax-yield condition is applied rigorously to the overall tax yield, i.e., so as to take account of any changes that may occur in the yields of the old taxes when new ones are introduced. All that this requires geometrically is that the constant-tax-yield plane  $efg$  is kept parallel to the no-tax plane  $xyz$ , and not to the plane representing the possibilities in the initial situation, which will include the taxes already being levied.

### (B) A WORD OF WARNING

One important shortcoming of the geometrical type of analysis that is being used here is the necessity of limiting the number of elements that can be adjusted simultaneously. In order to achieve the relative simplicity attained here, three is really the largest practicable number of elements that can be allowed to move freely at any one time. Ideally one would like to allow all decisions to be inter-related, and made simultaneously over the whole range of choice. This is not only difficult to handle conceptually, however, but there are good reasons for supposing that most human beings cannot cope with this 'general equilibrium' decision-making either! Nevertheless, it is important to bear in mind throughout that certain elements are being held constant and the field of choice is being artificially limited in scope to cover only the variable elements. Thus in our three-variable analysis of consumption, saving and leisure we not only suppressed adjustments in the pattern of consumption and saving and the type of work done or not done, but also limited the explicit planning horizon to one period. Conversely, in the three-period analysis we had to suppress adjustments in the level of earned income. Each of these abstractions from reality is justifiable in particular contexts, but it must never be forgotten that they are abstractions, and the nature of the abstraction must be carefully appraised before attempting to apply that particular kind of analytical framework to any specific real-life situation. For instance, if you are pretty sure, from other evidence, that capital taxes have negligible effects on the earning of income, then the assumption of given income in the three-period analysis is a harmless simplification. But if you consider that this particular effect is likely to be important in the situation you are confronting, then you must be very wary of using that kind of analysis, for it is likely to mislead you.

### (C) CONCLUSION

It would be unnecessarily repetitious to bring together here all the detailed findings concerning the effects of different direct taxes on persons, as set out in the preceding chapters. It is appropriate at this stage to consider in greater generality the nature of what we have been doing, and to indicate the purposes to which this analysis can be legitimately put (subject to the warning given in the preceding section).

Basically, the analysis has been directed towards answering the following question: assuming that some given sum of money is to be



raised by taxation from a particular individual, what effects would be produced by raising that sum by some specified direct tax (or combination of direct taxes) by comparison with the effects of raising that same sum by some other direct tax (or combination of direct taxes)? The direct taxes we have considered are a lump-sum tax, taxes on personal income, on personal expenditure, and on personal wealth, and we have compared them in their effects upon the amount and kind of work done by the individual in question, and on the amount and pattern of his saving and consumption.

All this has been done on the assumption that, when he has made whatever adjustments in his behaviour he deems desirable when confronted with each successive tax, the amount he pays over in taxation will be the same in each case. We are not therefore concerned with the problem of the distribution of taxation between individuals, i.e. with the 'incidence' of taxation in the ordinary sense of the word. Nor is it being implied that taxes which produce the largest re-adjustments in individual behaviour (i.e. the 'greatest distortions') are necessarily bad, or that those which generate relatively minor adjustments or none at all (i.e. are 'neutral') are necessarily good. It is not even to be inferred that a tax which is 'preferred' to another by the individual concerned is necessarily a 'better' tax in any more general sense . . . after all, some individuals have to make sacrifices for the sake of the rest. Thus even assertions such as 'welfare will definitely be greater under the expenditure tax' must be considered *factual* statements and *not value-judgments*. All that is being asserted in such a statement is that the impact of that particular tax upon that particular individual in that particular situation is such that *he* will prefer to pay the given amount of tax under the expenditure tax. This is simply a piece of evidence to be weighed in the balance along with other relevant considerations when a general decision as to the imposition or modification of a tax is being taken. This point is equally important when it comes to interpreting the more specific results we have obtained. To say that one tax leads to less saving than another of equal yield is not to condemn the former and praise the latter, but it is simply a statement of fact about the two taxes. There may be occasions when the Government needs a tax which discourages saving, in which case the former tax will be rated above the latter. And the same sort of considerations apply to all of our other results.

Nor is the 'equal-yield' condition sacrosanct. It has the great advantage that it makes it possible to isolate differential effects of taxes that are due to their respective structures, by neutralizing any differ-

ences that might arise from varying yields. But the analytical framework could equally well be put to work in a context in which some other variable were held constant, say the level of consumption of the individual. As a variant of this, we might instead be interested in comparing the effects on work, saving, tax yield, etc., of various tax measures each of which reduces an individual's consumption by some fixed amount. This sort of investigation might be needed if a Government is contemplating using taxes as an anti-inflationary weapon designed to reduce the general level of consumption demand. In such a situation, the actual level of tax revenues might be relatively unimportant, but any side-effects upon the supply of effort or on risk-bearing might be crucial.

Unfortunately it is not feasible to work out such alternative approaches in any detail in a book of this kind, but it is important that the versatility of the analytical tools be fully appreciated, for the analytical methods expounded here can easily be adapted to serve purposes other than those to which they are put here. The cases dealt with in the text are merely illustrative, they are by no means exhaustive.

Finally, may I emphasise that the whole tenor of this analysis is intended to be pragmatic and open-minded, for dogmatic prejudice has for too long been a major hindrance to dispassionate economic analysis of taxation, and especially of the direct taxation of persons.

## CHAPTER SEVEN

### Taxes on Business Profits

Businesses are not always easily distinguishable from persons in the matter of taxation. The one-man business is a case in point. The sole trader can be thought of as a 'self-employed' man, owning the capital invested in his business. It is sometimes advantageous in principle to regard his habit of financing his personal consumption expenditure straight out of his takings as being the wages he earns for the labour he has supplied to the business, or as interest on his capital, or as his reward for risk-taking, or all three. These distinctions are nevertheless artificial, for the individual himself does not make them. In connection with taxation it will sometimes be useful to regard these borderline cases as being instances of personal taxation (e.g. with respect to personal allowances and the rate of progression when income tax is levied), while at other times (e.g. when it comes to the impact of turnover taxes, or taxes on particular factors of production) it will be more useful to stress the business aspects of this admittedly hybrid phenomenon. For this distinction is not only blurred in the analytical context, but also in the actual practice of tax authorities. Some business taxes are limited in their application to incorporated firms, while others extend not only to unincorporated firms, but also to partnerships and even sole traders, while for other purposes the latter categories may be subjected to personal taxation. No hard and fast distinctions will therefore be enforced here. Whether or not the analysis that is being conducted at any stage is applicable to any particular sort of business will depend on the actual tax laws in the particular situation that is being analysed.

Several different kinds of tax will be analysed in this chapter. We shall begin with a sort of 'lump-sum' tax, such as a fixed annual licence duty, which can only be avoided if the business is wound up completely, but otherwise does not vary in amount whatever are the reactions of the business. Then will follow, in turn, an analysis of taxes on net profits, and of a tax on excess profits. In the next chapter we shall go on to consider gross taxes, a tax on 'value-added', taxes on various factors of production, and, finally, taxes on consumers' goods. In each case we shall be concerned with the

effects of the tax upon costs, output, price, the demand for factors (including investment), and upon profit distributions. Since we are still working within a micro-economic framework, however, the wider repercussions of these various reactions will not be considered at this stage.

### (A) A LUMP-SUM TAX

A lump-sum tax is equivalent to an increase in fixed costs by the amount of the tax. Since it does not vary with the level of output, or with the price charged for the product, it will not affect the marginal cost or the marginal revenue of the firm. Thus, in figures 7.1 and 7.2 are shown the short-run effects of such a tax upon a firm in a perfectly competitive market and upon a monopoly respectively.

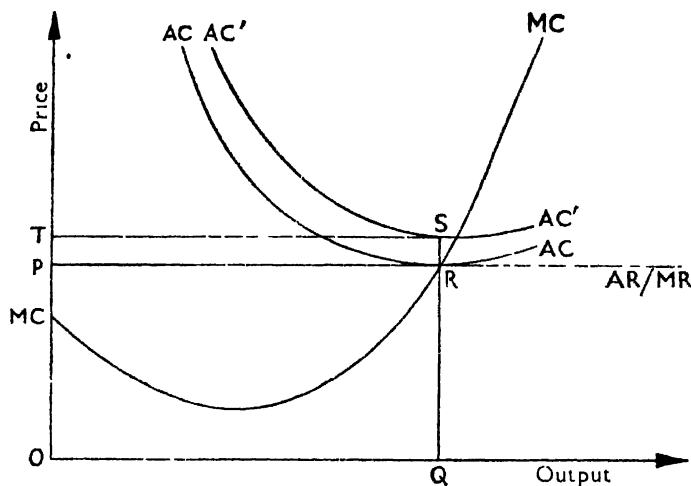


Figure 7.1

In figure 7.1 the firm was in long-run equilibrium (making only 'normal' profit) with an output  $OQ$  which is sold at a price  $OP$  per unit. The curve marked  $MC$  indicates the marginal costs of the firm, and  $AC$  its average costs. The lump-sum tax (the amount of which is indicated by the area  $PRST$ ) shifts the average costs from  $AC$  (before tax) to  $AC'$  (including tax), but leaves marginal cost ( $MC$ ) unchanged. (The vertical distance between  $AC$  and  $AC'$  will get smaller and smaller as the volume of output over which the lump-sum tax is averaged gets larger and larger.) Since, in a perfectly

competitive situation, price is given (and therefore average revenue ( $AR$ ) and marginal revenue ( $MR$ ) are also given and equal), then the output at which the firm maximizes its profits (i.e. where  $MC = MR$ ) is the same after the imposition of the tax as it was beforehand. After the tax, however, the firm makes a loss of (or has its normal profit reduced by)  $PRST$ , the amount of the tax. If the firm sees no prospect of this situation changing, then it will presumably close

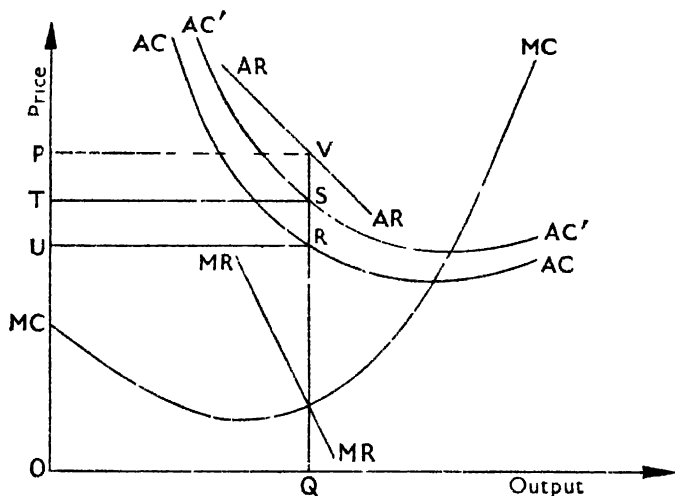


Figure 7.2

down so as to cut its losses. In the monopoly case depicted in figure 7.2, the monopolist was in equilibrium with an output  $OQ$  for which he charged a price of  $OP$  per unit. The cost curves are indicated as before, although the demand conditions are obviously different, as shown by the  $AR$  and  $MR$  lines. The impact of the lump-sum tax in this case is also such as to leave the marginal conditions, and therefore the optimum output, unchanged, but the effect on profits in this case is simply to reduce them from  $PV'RU'$  to  $PVST$ . It is quite conceivable of course, that a sufficiently large lump-sum tax could also put the monopolist in a position where he could only operate at a loss.

When we turn to the long-run effects, only the monopoly case will be considered, for the long-run adjustment in the perfectly competitive case depends on the industry-wide adjustment as determined by the reactions of the other firms, and especially on the rate at which

firms close down. Thus in figure 7.3 is set out the monopolist's long-run average cost curve ( $LAC$ ) which is an 'envelope' curve enclosing all the short-run average cost curves (such as  $SAC$ , which is the same as  $AC$  in figure 7.2). The long-run marginal cost curve ( $LMC$ ) is derived directly from  $LAC$  and not from the individual short-run marginal cost curves (such as  $SMC$  which is the same as  $MC$  in

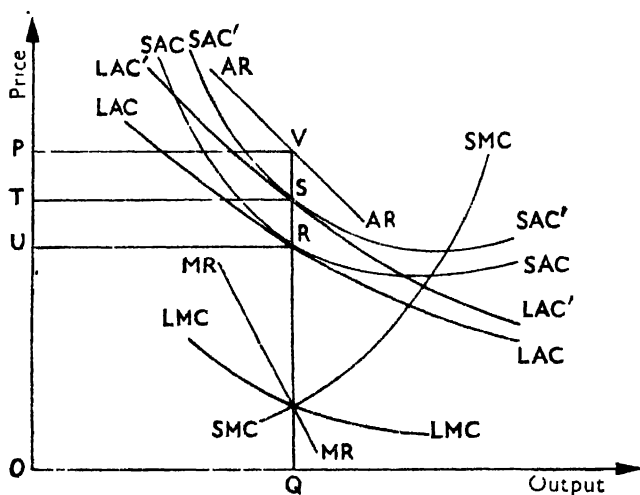


Figure 7.3

figure 7.2). The demand conditions are assumed to be unchanged. The monopolist was originally in long-run equilibrium at an output  $OQ$  and charging a price  $OP$ . Note that in this long-run equilibrium situation both  $LMC$  and  $SMC$  are equal to  $MR$ . The lump-sum tax shifts  $LAC$  to  $LAC'$ , the latter being the envelope curve enclosing the short-run average cost curves which include the tax, such as  $SAC'$  (which is the same as  $AC'$  in figure 7.2). But  $LMC$  is again unchanged, so that the long-run equilibrium output and price are also unchanged. All that happens, as before, is that the monopolist's profits are reduced by the amount of the tax. The long-run situation is, in fact, essentially similar to the short-run one.

There is one aspect of the matter, however, that requires this solution to be modified somewhat. In the long-run, investment in capital equipment can take place. The lump-sum tax will not affect the expected gross returns from such investment, but it may in a roundabout way, affect its cost. This is because the tax reduces the

disposable profits of the firm, which might have been distributed to shareholders, or re-invested in the firm. If it is re-investment of profits that is reduced, then total investment still need not be affected if the necessary finance could be borrowed easily on the same terms that apply to internally generated capital. But this may well not be so, so that the assumed reduction in re-investable profits will force the firm either to reduce the level of investment or to draw upon more expensive sources of finance, or both. It is probable that this effect is more marked in the case of small firms, for the imperfections of the capital market bear more hardly upon them. In this way, the costs of expansion in the long-run may therefore be raised, and in such a manner that both the average and marginal costs are raised once the level of output is reached at which the substitution of the more expensive external funds for the cheaper internal ones become necessary. In this roundabout way, then, the level of output may be reduced, and costs and prices increased, by the tax in the long-run. Note, however, that this effect depends on (a) the reduction of profit appropriations for re-investment (which may not occur because profit-distributions to shareholders may be cut instead); *and* (b) there being a need to replace such lost funds by outside borrowing; *and* (c) such outside borrowing being more expensive than the (opportunity) cost of using undistributed profits.

Only in this last special case will the pattern of factor use be affected by the tax, for in the others output and relative costs are unaffected, except where the tax forces the firm to go out of business. Where expensive borrowing is required to finance the purchase of any factor, then clearly that factor becomes relatively more expensive than the others, and some substitution of other factors for it may occur.

## (B) TAXES ON PROFITS

There are various methods by which business taxes are related to profits as the index of their taxable capacity. Here we shall first of all consider a simple proportional tax on net profits, and then go on to consider some of the difficulties encountered in defining 'net profits', and especially as regards the treatment of capital expenditure. After briefly considering some other complications associated with taxes on net profits, this chapter will conclude with a summary treatment of taxes on excess profits.

### (i) A SIMPLE PROPORTIONAL TAX ON NET PROFITS

In this section we shall analyse a simple proportional tax on net

profits and compare it with the lump-sum tax of the preceding section. The case of the perfect competitor will be ignored, since he made no profits, and all the relevant points can be made for the monopolist.

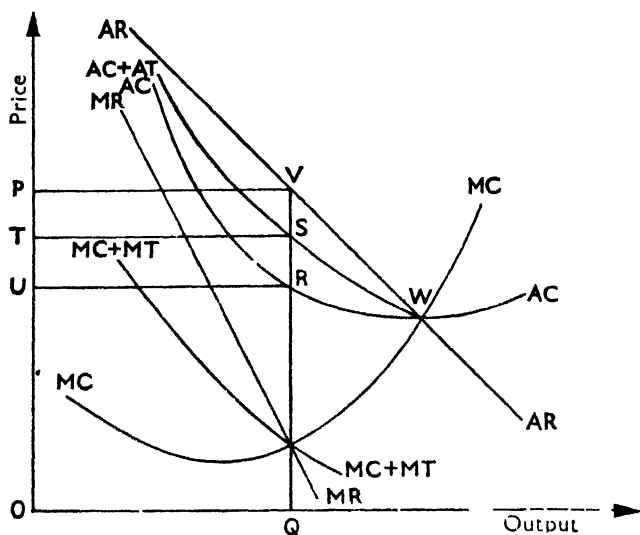


Figure 7.4

In figure 7.4 we have the monopolist again (see figure 7.2) operating under the same conditions as before. Now let us assume that a tax on net profits is imposed at a rate of 50 per cent. This would reduce his profit at the output  $OQ$  from  $PVRU$  to  $PVRT$ , the other half  $RSTU$  being taken in tax, the point  $S$  being mid-way between  $R$  and  $V$ . Taking all other levels of output (up to  $W$ ) where a profit is being made (i.e. where  $AR$  is greater than  $AC$ ) and plotting the points midway between  $AR$  and  $AC$  at each such output, we would derive the locus of all such points as  $S$ , and this is plotted as the curve  $AC + AT$ , i.e. average cost plus average tax. A similar process can be carried out for the marginal relationships, the result of which will be the curve  $MC + MT$ , representing the addition to costs and to tax liability of each unit increase in output. It will be noticed that at the optimum output,  $OQ$ , since no profit is made on the last unit produced (for  $MR = MC$  there) marginal tax is zero, so that  $MC + MT$  is the same as  $MC$ . At greater levels of output than this, each additional unit produced adds more to costs than it does to



revenue ( $MC$  is greater than  $MR$ ) and therefore profits are being reduced, and so is the tax liability, so that  $MT$  is negative, and  $MC + MT$  lies below  $MC$ . Thus if the firm takes account of the tax in calculating its most profitable output (i.e. if it equates  $MC + MT$  and  $MR$ ) then it will still choose the same level of output (and charge the same price) as it did before. Moreover it will be seen from figure 7.3 that since  $LMC = MR$  at this same output, then marginal tax is also zero in the long-run analysis, and consequently the long-run equilibrium will not be disturbed either.

The qualification concerning the possible effect on investment through the reduction of re-investment remains valid here but to it will be added the effect of the simple proportional tax on net profits in reducing the return on the investment when made. There is no need to elaborate this point here.

## (II) THE DEFINITION OF NET PROFITS

No questions have been asked so far about what goes into the cost curves except to maintain the distinction between fixed and variable costs, between average and marginal cost, and between the short and long run. Still less has been said about revenue. It is to further consideration of the meaning of these terms that this section and the next are devoted. In this section we shall be concerned mainly with current revenue and expenditure, leaving capital transactions until section (III).

As long as the kind of analysis we have been pursuing is being used to throw light on decision-making processes within a particular firm, then we simply adopt whatever conventions are used in that firm in defining revenue and costs, and even though we have to vary these definitions from firm to firm this will not matter. But once we start using these tools for purposes of tax analysis, this state of affairs cannot be permitted to continue. The tax authorities do not allow firms to adopt whatever conventions they like in arriving at net profits for tax purposes although firms can adopt what conventions they like in making their price and output decisions. It is therefore quite likely that there will be a noticeable dichotomy between the firm's definition and the tax authorities' definition of net profits.

The two major respects in which differences may arise on the cost side concern certain current business expenditure on the one hand, and the treatment of capital expenditure on the other. It is not our concern here to argue the case for or against treating such expenditures in one way or another. All that is relevant for this analysis

is that such differences do arise, and it is the various possible implications of this fact that will be considered here.

Some current business expenses (e.g. on entertainment, or additional remuneration for directors who are also controlling shareholders) may be disregarded by the tax authorities in calculating taxable profits, which means in effect that they are treated as distributions of post-tax profits, rather than as costs. If the firm, on the other hand, in its decision-making nevertheless treats such items as costs, then the levying of a 50 per cent tax on the revenue out of which they are to be met is equivalent to a tax of 100 per cent on that class of expenditure (e.g. if £1,000 were to be spent in this way, £2,000 would have to be set aside out of pre-tax profits to meet it). If the expenditure in question is a fixed cost, then the analysis follows that of the lump-sum tax in section (A) of this chapter, except that there is an additional discriminatory effect against that class of expenditures because of the virtual doubling of its cost as compared with the others. This discriminatory effect is analysed more fully in section (D) of Chapter VIII. However, if the disallowed expenditure is regarded by the firm as a variable cost, in the short or long run, then new possibilities arise which will be our next concern.

For simplicity's sake let us assume that the disallowed expenditure is a fixed sum per unit of output, and that the firm is not willing (or not able) to cut such expenditure (net) in spite of its unfavourable tax treatment. Both average and marginal costs (as interpreted by

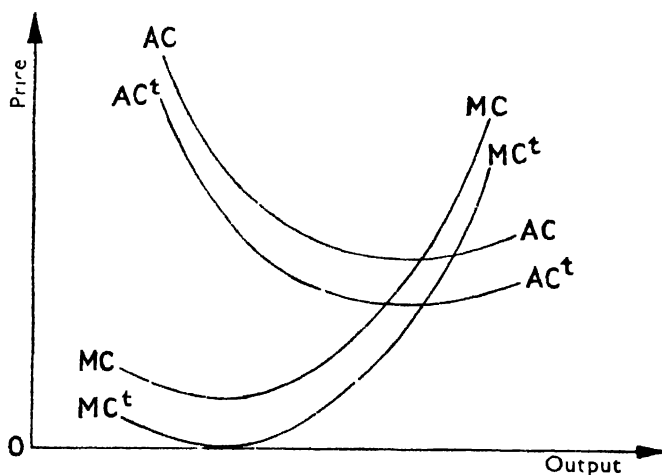


Figure 7.5

the firm) will therefore include these expenditures, but the costs that are taken into account by the tax authorities will exclude them. We therefore have the situation depicted in figure 7.5, where the original cost curves  $AC$  and  $MC$  are the ones used by the firm in its decision-making, and the lower cost curves  $AC^t$  and  $MC^t$  are those used by the tax authorities in calculating the tax liability (and therefore also used by the firm when calculating its tax liability). The first

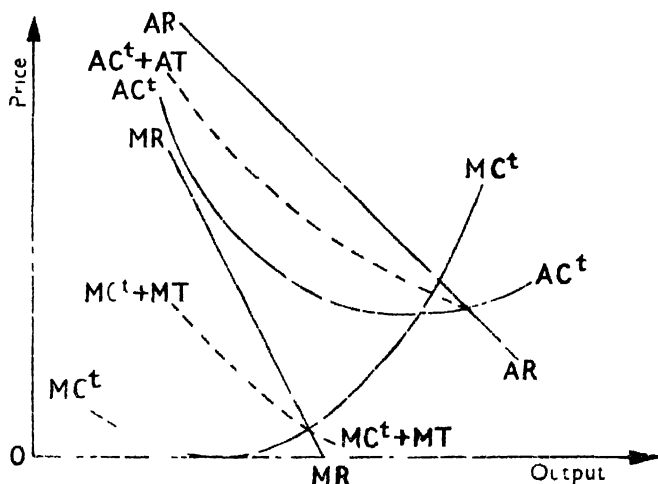


Figure 7.6

stage in the analysis of this situation is to calculate the tax liability, and this is done in figure 7.6, which follows the pattern set with respect to figure 7.4, but in this case uses the  $AC^t$  and  $MC^t$  curves instead. The second stage is to superimpose this tax liability upon the firm's own cost curves, and this is done in figure 7.7. Here the vertical difference between  $AC^t$  and  $AC^t + AT$  in figure 7.6 has been added to  $AC$  (from figure 7.5) to give  $AC + AT$ , and the vertical difference between  $MC^t$  and  $MC^t + MT$  added to  $MC$  to give  $MC + MT$ . It is now these composite cost curves ( $AC + AT$  and  $MC + MT$ ) that the firm will take as relevant for its decision-making, for the marginal tax liability will be treated as an addition to marginal costs in the ordinary way. Moreover, it will be seen that, contrary to our earlier findings, in this case the marginal relationships are affected, and consequently the optimum price and output will change. When  $MC + MT$  is equated to  $MR$  (in order to maximize net profits as defined by the firm) then the resulting output will be

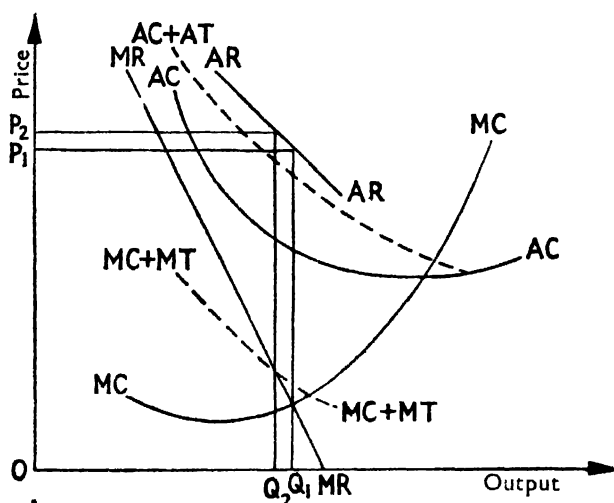


Figure 7.7

$OQ_2$  (instead of  $OQ_1$  previously), and the price charged will be  $OP_2$  (instead of  $OP_1$  previously).

Thus we may conclude that, in the short run, if the tax authorities are more restrictive in their definition of costs than is the individual firm, and the latter continues to spend the same amount of money on the disallowed item and persists in considering it a cost in its price and output decisions, then the tax will lead to higher prices and lower output than in the pre-tax situation. A long-run analysis would show that similar results hold in that context also. Besides the discriminatory effect on the disallowed expenditure, the reduction in the level of output will also affect factor use generally by reducing the demand for the variable factors.

It need hardly be added that this whole analysis has simply to be thrown into reverse to deal with the opposite case where a firm is able to treat as costs for tax purposes items which are, in its eyes, distributions of profit.

### (iii) THE TREATMENT OF CAPITAL EXPENDITURES

Capital expenditure by firms present many of these same problems in an even more acute form. Even within the firm there are several problems of apportionment that arise in this respect: firstly, at what rate should the cost of a capital asset be charged against output, or, in other words, what is the proper rate of depreciation or write-off

for any capital asset from the costing or pricing viewpoint; secondly, since such assets normally have a fairly long economic life by comparison with other factors of production, their current replacement cost may be very different from what the asset actually cost when it was purchased (and its cost when it comes eventually to be replaced may be different again), so that if the cost which is apportioned is the actual 'historical' cost of the asset, then this factor is being priced on a different basis from currently purchased factors, with consequent probable distortion of true cost relationships.

But quite apart from these costing problems facing any particular firm, there are additional complications when the interests of the tax authorities are taken into account. Capital expenditure as such is usually not chargeable against current revenue for tax purposes. Instead, depreciation charges are allowed at fixed maximum rates which are 'notional' in the sense that they do not represent any actual current outlay (current expenses on repairs and maintenance are usually considered current expenditure and treated accordingly), but are simply an allowance of part of the actual past outlay on the capital equipment which may be charged against current revenue in the year in question. If replacement cost is used as the basis for calculating the depreciation allowance, then instead of it being an allowance of some past capital outlay it becomes a provision for some future outlay, but it is still (indeed even more) 'notional'. Since such allowances are notional, then it is difficult to say whether or not any particular charge is 'right', since all schemes are arbitrary in the last resort. The tax authorities are anxious to apply standard procedures as far as possible, and are also anxious 'to protect the revenue', i.e. not to allow depreciation charges to become a loophole in the tax laws through which a great deal of tax avoidance occurs. From this point of view there is a clear conflict of interest between the firm and the tax authority, for the former wants depreciation allowances to be as liberal as possible, and the latter for them to be as restrictive as possible. What usually happens is that the tax authorities specify what methods of calculating depreciation are acceptable to them, and the firm then chooses whichever of the admissible methods is the most advantageous to it. Even so, it is quite likely that the sort of discrepancies will arise that were discussed in the preceding section, namely, that the amounts deductible as costs for the purposes of taxation will fall short of the amounts that firms actually tend to set aside. To the extent that this happens in the case of depreciation allowances, the analysis of the preceding section will be valid here too.

But there are also devices in common use by tax authorities which work in precisely the opposite direction. Examples are provisions for 'accelerated depreciation', for 'free write-offs', for 'initial allowances', or 'investment allowances'. The varying details of these schemes need not detain us here, but their general effect in each case is to allow larger (or earlier) deduction of capital expenditure from current revenue in calculating taxable profits, than would be the case under the ordinary depreciation allowances. If these provisions are general and sufficiently liberal, they may not only offset the bias just described, but may actually reverse it. But quite frequently they are used in a deliberately selective way, to apply only to certain classes of asset, or to assets purchased within a certain time period, or to assets used for a special purpose. In these cases, there will be superimposed upon the general effects discussed earlier, certain discriminatory effects between different classes of investment and/or between investments made at different times or for different purposes.

#### (iv) OTHER COMPLICATIONS

There may be a further discriminatory effect upon investments of different sorts if the tax authorities regard interest or mortgage payments as deductible costs but dividends as shares of profit, for in this case the raising of capital in ways that carry a fixed-interest obligation becomes relatively cheaper than those which earn a reward that has to be paid from taxed revenue.

But probably more important than this is the discriminatory element that is introduced deliberately into some taxes on profits, whereby profits distributed to shareholders (by way of dividends, etc) are taxed at different rates to those which are retained in the business (for instance added to reserves). Let us assume that this discrimination takes the form of imposing a higher rate of tax on distributed than on undistributed profits. Obviously, this increases the relative cost of taking money out of the firm, and makes it relatively cheaper to retain funds for reinvestment (rather than, say, paying them out to shareholders and then seeking fresh funds through the stock exchange). The combined effect of this change in the relative cost structure will be to increase the reward (in terms of tax avoided) for finding means of getting such funds into the hands of shareholders in ways which the tax authorities accept as 'costs' for tax purposes (e.g. more liberal expense accounts for director-shareholders). If less profits are distributed and more 'ploughed back' into the firm, then the capital value of the firm is likely to grow,

and if its shares are realizable, and capital gains on such shares are not taxed, or not taxed as heavily as other kinds of income, then this capital appreciation effect may be more advantageous than dividend distribution. There are therefore many further repercussions that may result as the firm adjusts to such a situation, and its shareholders react accordingly.

In this connection too mention must be made of the effects of these various discriminatory elements upon risk-taking. The relatively favourable tax treatment of interest payments as opposed to dividend distributions will clearly have repercussions in this field. But in less obvious, but no less important, ways so will the disturbance of the relationship between internal and external sources of investable funds. If a firm has to be more cautious in the uses to which it puts externally raised capital, then forcing it to rely more on such capital may force it to take less risks. The opposite effect may, of course, follow if the tax leads to smaller dividend distributions in order to increase the retention of profits. As might be expected, the nature of the loss offset provisions will also be important, but not in quite the same way as before. If firms are allowed to set off losses in one line of business against profits in another, then clearly the multi-product firm has an advantage over the specialized firm in this respect, and may therefore be better able and more willing to take risks.

Thus in many different ways (of which only a selection have been mentioned here) the process of defining the tax base more closely may have both intended and unintended discriminatory effects upon the behaviour of firms, that may be quite far removed from the main purposes of the tax.

#### (V) A TAX ON EXCESS PROFITS

Taxes on excess profits are levied on all profits above some stated minimum. This minimum (or 'standard') profit is usually calculated for each firm individually, and will be based on one or other (or some combination) of the following criteria:

- (a) actual profits of that firm in some past period;
- (b) actual rate of return on capital employed in some past period (which is then applied to the actual capital currently employed);
- (c) a given (notional) rate of return to be applied to actual capital employed in the current period;
- (d) some fixed sum.

The firm is usually allowed to choose whichever of these various

criteria is found most advantageous to it (i.e. the one which gives the highest 'standard' profit). The standard profit, as thus determined, is the amount of profit that will be exempt from the excess profits tax, all amounts above this being taxed at the set rate (which may be as high as 100 per cent!). Usually, payments of other taxes are a deductible expense in calculating liability for this tax, and there may be some overall limit on the amount of excess profits tax that is payable (e.g. that it shall not be more than a certain percentage of total profits, i.e. including standard profit).

For simplicity, let us assume that the tax is a simple proportional one on all profits in excess of the standard profit, and that the firm has chosen the fixed sum (alternative (d) above) as the most advantageous method of computing this standard profit. Up to this level of profits, no tax is payable, and thereafter let us assume the tax rate to be 50 per cent. The effect on the marginal relationships in the range of profits in which tax is payable is therefore precisely the same as that of the simple proportional tax on net profits analysed earlier. The average rate of tax will of course be lower, because of the exemption of profit up to the fixed standard. Because the marginal relationships at the optimum level of output are unchanged, there will be no short-run effects on price or output, except in the indirect ways mentioned earlier.

The long-run analysis presents the same situation as before, but there are some additional complications associated with this tax that must be gone into more thoroughly. Taxes on excess profits are usually temporary taxes, imposed only in emergencies such as wars, and firms know this, although they cannot usually tell just how long the tax is going to be levied. There is therefore a foreseeable future in which no excess profits tax is going to be levied, and if a firm is currently paying excess profits tax, then it may well find it worth while to increase those current expenditures (and thereby reduce current tax liability) which increase future profits (when the overall tax rate will be lower). One obvious such expenditure is long term advertising. A 50 per cent excess profits tax rate thus becomes a 50 per cent subsidy on such outlays, so that the test as to whether such expenditure is worth while or not becomes a less stringent one than it would be in the absence of the tax. It is not uncommon for the tax authorities to attempt to protect themselves from this reaction by having inserted in the tax provisions a clause giving them power to disallow, for purposes of computing taxable profits, outlays which they considered 'excessive' or 'unreasonable', but the efficacy of such provisions is open to question.



The other main difference between a tax on net profits and a tax on excess profits is that the impact of the latter depends not only on the current situation of the firm in question, but also upon its past history. Two firms whose current situations are identical may nevertheless be treated quite differently under the excess profits tax, because, say, one had been very prosperous in the past and had therefore a very high standard profit (and therefore a relatively low current tax liability), whereas the other had no such record of prosperity (it might in fact be a fairly new firm) which could, therefore, only attain a relatively low 'standard' profit, and hence be subjected to relatively heavy current taxation of its 'excess profits'. Thus not only may different industries be differently affected by such a tax (according to the general levels of their past profits) but different firms in the same industry may well also be affected differently.

## CHAPTER EIGHT

### Other Business Taxes

Taxes on net profits are taxes on gross revenue minus gross cost. Turnover taxes are taxes on gross revenue itself, and taxes may also be levied on gross costs or on gross expenditure. If we ignore changes in net indebtedness and in liquidity, the relationships between these various tax bases is as follows:

Gross Expenditure	Gross Revenue <i>minus</i> Distributed Profits
Gross Costs	Gross Expenditure <i>minus</i> Gross Investment <i>plus</i> Depreciation
Net Profit	Gross Revenue <i>minus</i> Gross Costs Distributed Profits <i>plus</i> Gross Investment <i>minus</i> Depreciation

(where 'Gross Investment' means the purchase of capital goods)

All gross taxes have one general effect that is absent from taxes on net profits, and that is that they provide a strong incentive towards the 'vertical integration' of firms. Such mergers have the effect of converting what were previously expenditures, costs or revenues into purely internal book-keeping transactions, thus reducing the tax base. This general effect can be offset broadly in one of two ways. The first is to levy the tax at a single stage only. If the tax is imposed at an early stage in the productive process, then it becomes a tax on certain raw materials and intermediate goods (see section (D) below) and if it is imposed at a later stage it becomes a tax on consumer goods (see section (C) below). The other way of handling the problem is to convert the gross tax into a tax on 'value added', and such a tax is the subject-matter of section (B) below.

Quite apart from this general effect, the various gross taxes have somewhat different impacts from each other, because of their differing tax bases. The gross expenditure tax exempts distributed profits from the tax base as compared with a gross revenue tax, while the tax on gross costs excludes actual expenditure on capital goods but includes depreciation. If both are simple proportional taxes levied at the same rate, then in the long run the result will be the same, of course, but the timing of the tax liabilities will differ,

and this introduces important variations. All three gross taxes will shift both average and marginal relationships (the gross revenue tax shifting the revenue curves and the other two the cost curves), so that output, prices and profits will all be affected. With simple proportional taxes (as assumed throughout this chapter) these shifts will be simple proportional shifts over the whole range of output, and will bear no direct relationship to net profits.

### (A) TAXES ON GROSS REVENUE AND ON GROSS COST

In figure 8.1 the impact of a simple proportional tax on gross revenue is set out. For simplicity's sake, average and marginal costs are assumed constant and equal (i.e. no fixed costs) at  $AC_0/MC_0$ . The demand curve ( $AR_1$ ) and its associated marginal revenue curve ( $MR_1$ ) produce a pre-tax optimum output  $OQ_0$  (where  $MR_1 = MC_0$ ), which is sold at a price  $OP_0$ . A 10 per cent gross revenue tax will shift the net receipts of the firm from  $AR_1$  to  $AR_2$  and from  $MR_1$  to  $MR_2$ , i.e. to 90 per cent of their previous level at each level of output. The post-tax optimum is then found by equating  $MR_2$  and  $MC_0$ , which gives an output of  $OQ_1$  (which is less than  $OQ_0$ ) and a price  $OP_1$  (which is more than  $OP_0$ ). The tax yield will be  $RSTP_1$  (i.e. the difference between  $AR_1$  and  $AR_2$  multiplied by the output  $OQ_1$ ).

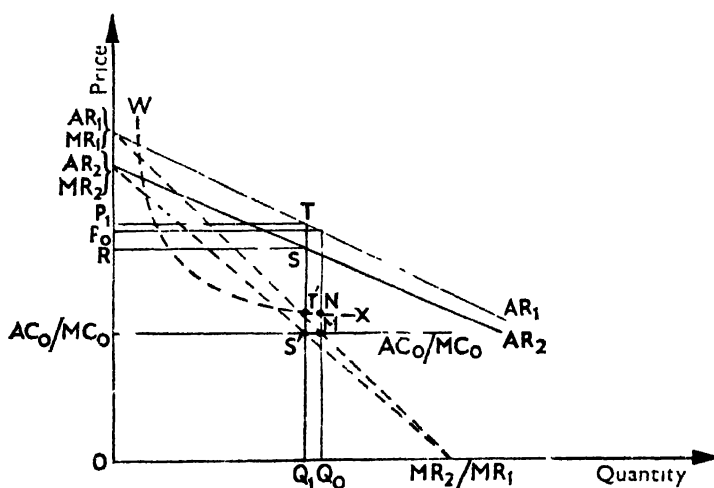


Figure 8.1

To compare this outcome with that under a tax on gross costs which has the same tax yield, it will first be necessary to construct a locus of all the points at which such a tax would produce the yield  $RSTP_1$ . What is required is that at each level of output, the average cost curve is shifted upwards by a sufficient amount so that when this increase is multiplied by the output in question it produces the desired amount in tax. The size of the shift in the average cost curve represents the rate of the gross cost tax per unit of output. Thus at the output  $OQ_1$  the required shift would be by  $S'T'$ , which is equal to  $ST$ . Similarly, at an output which is half of  $OQ_1$  the shift would have to be twice  $S'T'$ , and so on. The line  $WX$  is the locus of all these points such as  $T'$ . If the gross cost tax is to produce the required yield at any chosen output, then the (horizontal) average cost curve (including tax) must be at the level indicated by  $WX$  at that output. But for an output to be chosen, the (horizontal) marginal cost curve must intersect the marginal revenue curve ( $MR_1$ ) at that output. Thus the output which satisfies all our conditions is that at which  $WX$  intersects  $MR_1$ . In figure 8.2 this is shown as the point  $V$ ,

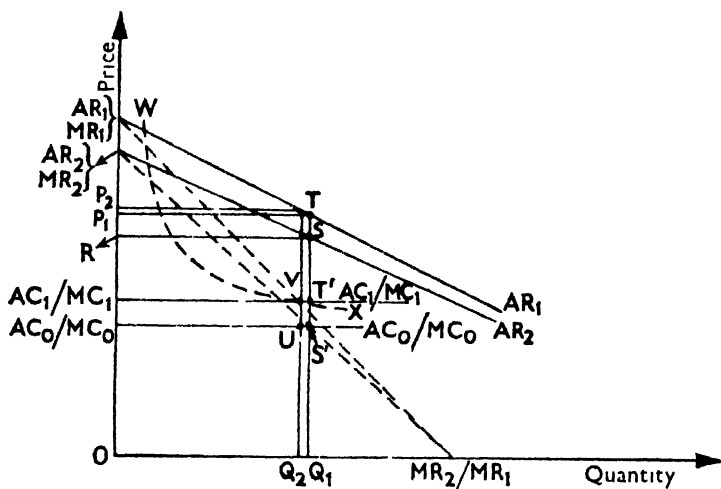


Figure 8.2

and the appropriate cost curve including the gross tax is shown as  $AC_1/MC_1$ . The rate of the gross cost tax is therefore  $\frac{UV}{UQ_2}$ , the tax yield  $UV \div OQ_2$  ( $RSTP_1$  by construction), the optimum out-

put  $OQ_2$  (lower than under the gross revenue tax) and the price charged  $OP_2$  (higher than under the gross revenue tax). These conclusions still hold under the more usual assumptions about the shape of the cost curves, but the analysis then gets more complicated.

The data in figures 8.1 and 8.2 can also be used as the basis for a comparison between a proportional tax on net profits and proportional taxes on gross revenue and on gross costs. Under the net profits tax we find, of course, that the optimum output remains at  $OQ_0$  with a price  $OP_0$  and a tax yield  $MN \cdot OQ_0$  ( $RSTP_1$  by construction, since  $WX$  represents the positions to be assumed by  $4R + AT$  at each level of output if the yield condition is to be satisfied). Thus the outcome under a net profits tax is that output is greater, price lower and post-tax profits greater than under a gross revenue tax (and, *a fortiori*, than under a gross cost tax) of the same yield.

The effects on investment of these gross taxes, via the cost of borrowing, are the same as with a lump-sum tax of equal yield. These taxes do not affect the actual net return on investment, since they are not levied on net profits, but to the extent that such investment increases gross revenue or gross expenditure or gross costs (whichever is the base of the tax under consideration), then there will obviously be an additional effect by this route. Clearly, investments promising high net profits relatively to gross revenues, etc., will become relatively more attractive than those with a rather low 'net profit margin'. Thus, both because of their short-run effects on output, and because of their long-run effects on investment, the pattern of demand for factors can be expected to change under the impact of such taxes.

## (B) A TAX ON VALUE-ADDED

Leaving aside gross taxes for the time being, let us now devote some attention to a simple proportional tax on value-added. In this type of tax, any 'inputs' (purchases of raw materials, fuel, equipment, etc.) that have already been subjected to this tax, will be deductible expenses in calculating the value of the output to be subjected to the tax in the firm in question. An alternative method of computation is calculate gross value of the output and apply the tax rate to that, then deduct from the gross tax liability the amount of tax already paid by other firms on any of the inputs involved, thus arriving at the net tax liability of the firm in question. With a uniform proportional tax the two methods produce the same results, but if the tax

is applied at differential rates in different industries the two outcomes will not in general coincide.

As has already been indicated, this kind of tax does not provide a general incentive towards vertical integration, as do the gross taxes considered in section (A) above, for the 'value-added' is not affected by such mergers. What such a tax in fact does is to tax gross revenue *minus* certain costs. In this respect there is a formal similarity to the tax on net profits, but there is one important difference. Although both taxes will in general allow the deduction of the costs of raw materials, fuel, equipment, etc. (which are all purchases from other firms which will have been taxed), the one major 'input' that is not deductible in arriving at 'value-added' but is so deductible in arriving at 'net profit' is the cost of labour purchased from persons. There is also, incidentally, a problem regarding imported goods and services used in the productive process, which might have to be dealt with via tariffs in order to maintain comparability with the treatment of the corresponding domestic goods and services. A tax on value-added is, therefore, more or less a tax on net profits *plus* the labour content of output, and it is in this light that the tax is analysed in this section.

Thus in figure 8.3,  $AC'$   $MC'$  is the cost curve of the firm, and  $AC''$   $MC''$  the cost curve when the direct labour costs are excluded (for

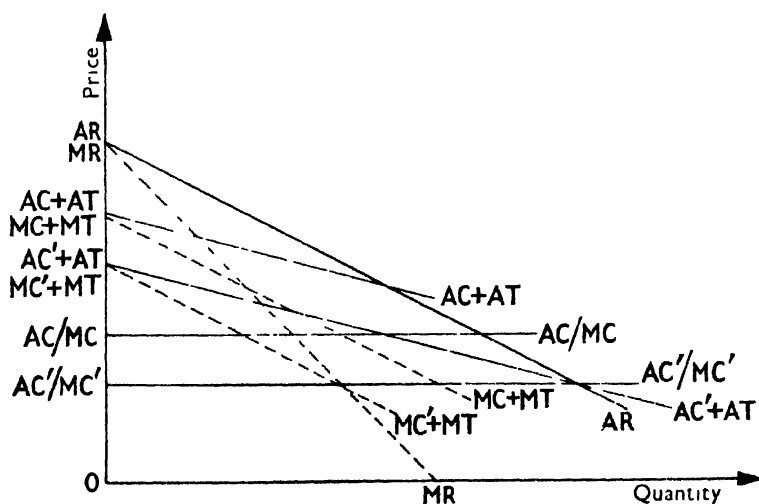


Figure 8.3

simplicity's sake these are assumed to be a constant amount per unit of output) The 'value-added' is therefore the difference between gross revenue and  $AC - MC$ . If the tax is a simple 50 per cent tax, then the average tax ( $AT$ ) will be half the vertical difference between  $AR$  and  $AC$ , and the marginal tax ( $MT$ ) half the vertical difference between  $MR$  and  $MC$  as indicated by  $AC - AT$  and  $MC - MT$  respectively. For the firm's decision making purposes, the relevant

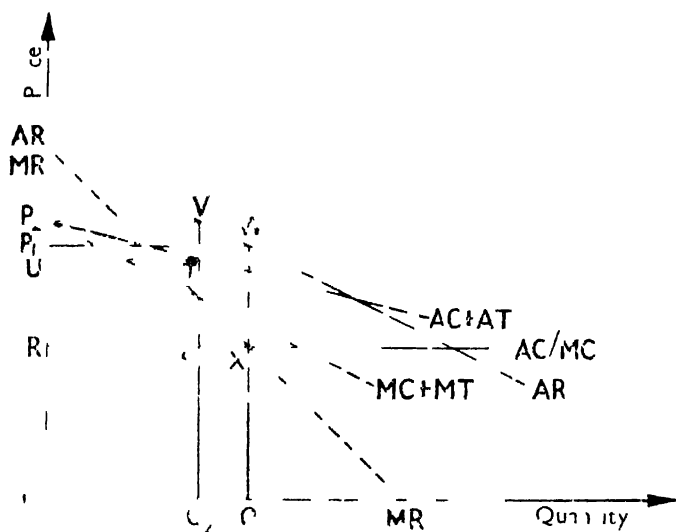


FIGURE 8.4

cost curves will be those arrived at by adding the tax liability to the overall cost curve (this producing  $AC + AT$  and  $MC + MT$ ). From figure 8.4 it will be seen that the effect of the tax will be to reduce the optimum output from  $OQ_1$  to  $OQ_2$  (i.e. from where  $MR = MC$  to where  $MR = MC + MT$ ) and to increase price from  $OP_1$  to  $OP_2$ . The amount of tax paid will be  $RSTU$ , and profits will have been reduced from  $RXYH$  to  $CTIP_2$ .

The analysis is carried a stage further in figure 8.5, where a basis is established for comparing a value-added tax with other business taxes of equal yield. In the initial situation where the optimum output is  $OQ_0$  and the optimum price  $OP_0$ , a tax on gross revenue is imposed (cf. figure 8.1) which shifts the optimum output to  $OQ_1$  (where the new marginal revenue curve net of tax,  $MR'$  intersects the  $MC$  curve), and the optimum price to  $OP_1$ . The tax yield will be

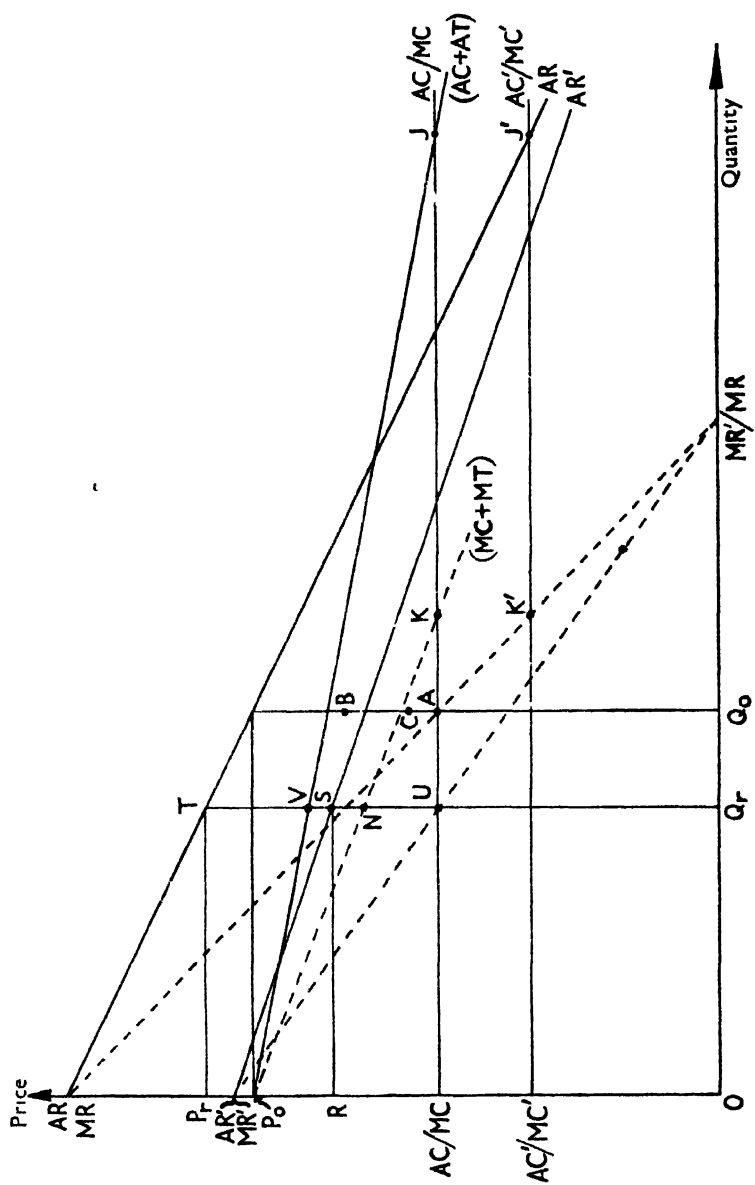


Figure 8.5



*RSTP*. The problem now is to construct the locus of all the points at which the average costs plus the average tax ( $AC+AT$ ) must be at any output if the yield of the value-added tax is to be *RSTP*. The easiest output at which to begin is  $OQ_r$ , for here we know that the average tax has got to be *ST*. A value-added tax of the sort we are considering raises both average and marginal costs in a way that we have already investigated (see figure 8.3), so that at  $OQ_r$  we know that the  $AC+AT$  line must pass through the point *V* (where  $U=ST$ ). But where will the associated  $MC+MT$  line be at this output? In figure 8.3 we saw that the value-added tax is calculated with respect to the costs  $AC''$  and  $MC''$  (not  $AC$  and  $MC$ ), but that the tax so calculated is then added to  $AC$  and  $MC$  to analyse the firm's output decision, and under our special simplifying assumptions  $AC'MC$  lies above  $AC''MC''$  by a constant amount. All this means that the line  $AC+AT$  will intersect  $AC'MC$  at *J* (in figure 8.5), i.e. at the same output where  $AR=AC''$  at *J'*. Similarly we shall find that  $MC+MT$  will pass through the point *K* on  $AC'MC$ , at the same output where  $MR=MC''$  at *K'*. This gives us the two fixed points we need to solve our problem, since under our simplifying assumptions all the 'curves' are in fact straight lines, for we now have all the information we need to draw in the  $AC+AT$  curve through *V* at  $OQ_r$ , and its associated  $MR+MT$  curve. The  $AC+AT$  line must pass through *J* as well as *V*, and that enables us to draw it in since it is a straight line, and from the point where it intersects the vertical axis we can draw  $MC+MT$  to pass through *K*. We then find that the  $MC+MT$  given by this curve at  $OQ_r$  is  $NQ_r$ . In this way we have established one point on the locus of  $AC+AT$  points (*V*) and one on the locus of  $MC+MT$  points (*N*) satisfying the equal yield condition for the value-added tax (at the level of output  $OQ_r$ ). We then turn to another level of output, say  $OQ_n$ , and by the same process identify the points *B* and *C* respectively, and so on for every other output. In figure 8.6 the locus of all the  $AC+AT$  points such as *V* and *B* is indicated by *WX*, and that of the associated  $MC+MT$  points such as *N* and *C* by *YZ*.

What has been achieved so far is the setting out of all the possible outcomes under the value-added tax which satisfy the tax yield condition. But in order for any particular outcome to be chosen by the firm, it has to satisfy the profit-maximization condition, namely  $MR=MC+MT$ . If we look at *YZ* (which plots every admissible  $MC+MT$ ) we find that it intersects *MR* at *H*, so that the optimum output (among those that interest us) is  $OQ_1$ . Although the  $MC+MT$  line through *H* has not been drawn in on figure 8.6, it will be obvious

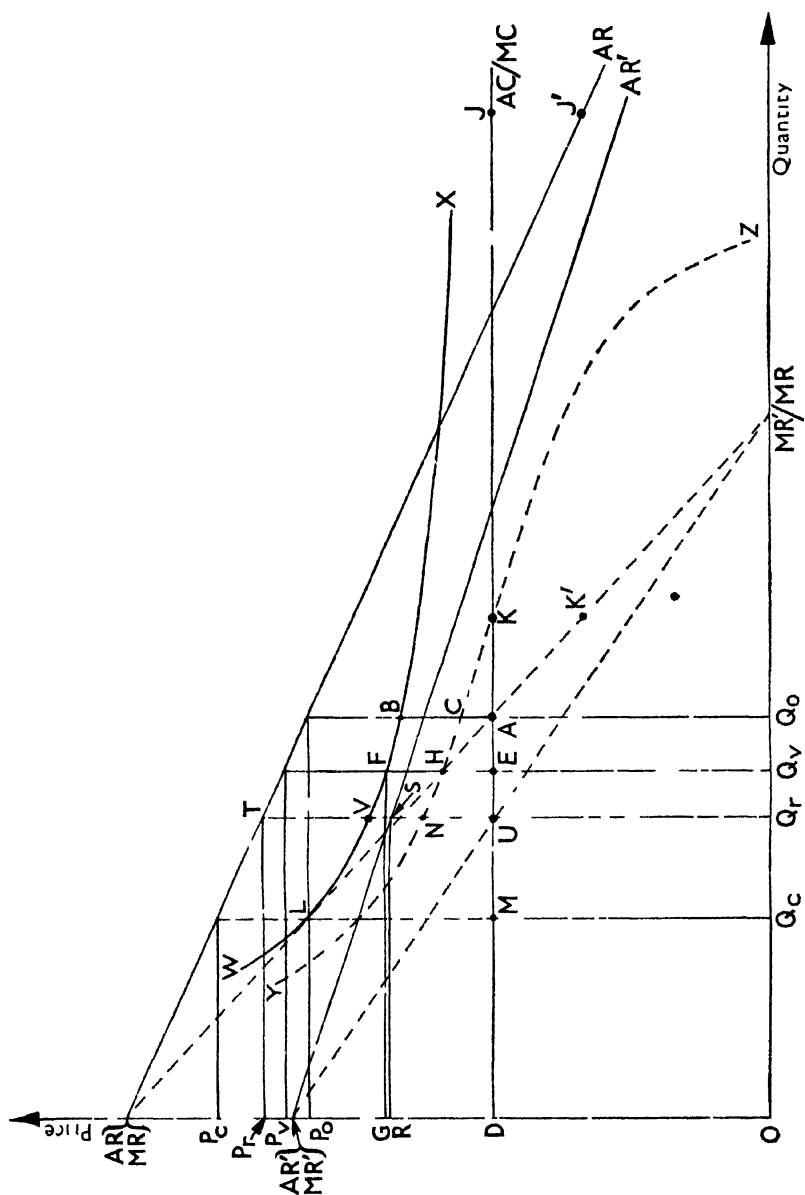


Figure 8 6

from the construction of  $YZ$  and  $WX$  that the corresponding  $AC+AT$  line will give a level of  $AC+AT$  at  $OQ_1$  of  $FQ_1$ , so that the amount of value-added tax paid will be  $DEFG$ , which, by construction, will be equal to  $RSTP_1$  (the yield under the gross revenue tax). Thus, although the value-added tax reduces the optimum output and raises the price by comparison with the no-tax situation, it does not do so as much as the gross revenue tax does, assuming equal tax yields.

The comparative results from equal-yield taxes on net profits and on gross costs can also be examined with the help of figure 8.6. We already know that (barring the complications analysed in the previous chapter) the net profits tax leaves the optimum output and price unchanged, its sole result being to reduce profits by  $AB \times OQ_0$  ( $-RSTP_1$ ,  $DEFG$ ). A tax on gross costs, on the other hand, will shift the  $AC'MC'$  line upwards uniformly (see figure 8.2). If such a parallel upward shift of  $AC'MC'$  is to produce the required tax yield, it must be equal to  $WX$  at the output in question and if it is to be an optimum output the new  $AC'MC'$  must equal  $MR$ . On figure 8.6 the only point at which both these conditions are simultaneously satisfied is at  $L$ , giving an optimum output of  $OQ_1$ , a price of  $OP_1$ , and a tax yield of  $DMLP_0$  ( $-RSTP_1$ ). In this case the reduction of output and the rise in price are greatest of all the equal-yield taxes that we have considered. So, in order of succession from the least shift to the greatest, we have first the tax on net profits, second the tax on value added, third the tax on gross revenue, and fourth the tax on gross cost; assuming that each tax produces the same yield in equilibrium. The implications for the relative effects on factor use are obvious.

All these adjustments are, of course, short-run ones. In the long run these conclusions will have to be modified because it will no longer be valid to assume the pre-tax cost curves constant under the various gross taxes (including the value-added tax), nor will the demand for the firm's products necessarily be unaffected. If these taxes are general and uniform, they will lead, as we have seen, to increased prices by all firms, and since the products of some of them will be the factors of production (raw materials, etc.) purchased by others, then the latter's costs will rise as a result of the tax on the former. Moreover the cut in output will mean a fall in the demand for factors even at the existing prices. This will result in changes in relative and absolute price levels, with further repercussions (via household incomes) on the demand for consumers goods, and so on. However, these further effects cannot be handled satisfactorily within the present analytical framework, for they could only be

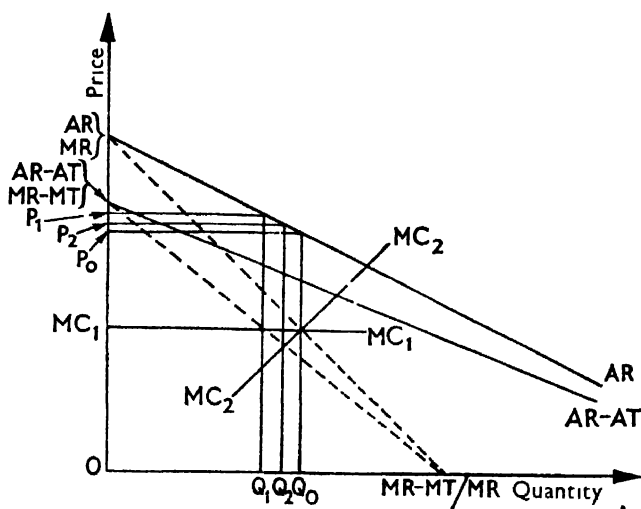
introduced by arbitrarily assumed shifts in the revenue and cost curves. Instead, they will be postponed until Chapter XII, when we shall be considering these wider repercussions within a more general macro-economic framework of analysis.

### (C) A GENERAL SALES TAX

If the gross revenue tax is levied only at the final stage in the productive process, i.e. when goods or services are sold to 'final' consumers (i.e. persons who are not businesses), then it becomes a non-cumulative general sales tax. If it is levied at a uniform *ad valorem* rate, and if it affects equally the prices of everything that consumers buy, then it is the same as a simple proportional direct tax on expenditure. But sales taxes are never truly general in that they include all items of consumer expenditure, and even if they were, the imposition of such a tax at a uniform rate would not affect the prices of all consumers' goods and services to the same extent.

As far as the producer of any 'final' consumers' good is concerned, a general sales tax operates like a gross revenue tax. From the analysis in figure 8.1 we know that it will lead to a lower output and a higher price, assuming costs and demand constant. With the gross revenue tax there was good reason to suppose that costs would not remain constant, however, because the firms producing the 'intermediate' goods purchased by the firm in question would also be reacting in the same way to this tax. But the general sales tax would not be levied on these other firms, so that this effect is absent here. But the fall in the firm's own output (and that of other taxed firms) will bring about changes in the demand for factors, and thereby probably also in their prices. Similarly, there will probably also be general, though indirect, repercussions upon consumer demand. Again, consideration of these macro-economic effects is postponed for a later chapter.

The immediate task is to show that, even if factor prices and consumers' demand remain unchanged, a uniform *ad valorem* general sales tax will not have the same effects on the prices of all the items taxed. Thus in figure 8.7, a general sales tax is imposed which shifts the *AR* line to *AR-AT* and the *MR* line to *MR-MT*. If marginal cost is constant at  $MC_1$  then the optimum output will shift from  $OQ_0$  to  $OQ_1$ , and price from  $OP_0$  to  $OP_1$ . But if marginal costs are rising, as with  $MC_2$ , then output will only fall to  $OQ_2$ , and price will only rise to  $OP_2$ . Thus the extent of the price/output adjustment will depend on the elasticity of supply in the range of adjustment. It



will also depend, similarly, with respect to  $MR$  instead of  $MC$ , upon the elasticity of demand over this same range. Since these relative elasticities will in general differ from product to product, from industry to industry, and from firm to firm, prices cannot be expected to rise uniformly as a result of such a tax.

## (D) TAXES ON PARTICULAR FACTORS OF PRODUCTION

It was pointed out earlier that if a gross tax is levied once only, and at an earlier stage in the productive process, then it becomes virtually a tax on certain raw materials, intermediate goods or capital equipment, and is similar in effect to a tax on a particular group of factors of production. But there are also taxes which are much more obviously of this kind. Taxes on fuels, on the occupation of business property, on the number of people employed or on the total wage-bill, on commercial vehicles, as well as tariffs on imported raw materials, and so on, are all taxes on particular factors of production. Such taxes may be specific (or unit) taxes, i.e. levied at so much per physical unit of the factor, or they may be *ad valorem* taxes, i.e. levied according to the value of the factor.

In this section, it will first be assumed that the pre-tax supply price of the factor in question is unaffected by the tax (i.e. the tax is simply

added to the pre-tax price to get the new purchase price). The effects on relative factor use and upon total costs, output and price, of such a tax will be considered in this light. Subsequently the possibility will be investigated that the pre-tax price of the factor may be adjusted after the tax, and the previous analysis modified accordingly.

### (i) EFFECTS ON FACTOR USE

It has been assumed throughout this analysis that firms adopt methods of producing their optimum output which minimize their costs. The combination of factors (given the available techniques) which minimizes the cost of production for any particular output will depend (among other things) upon the relative prices of the various factors. This can be indicated quite simply with the traditional tools of 'isoquants' and 'isocost lines', as in figure 8.8. On the axis are

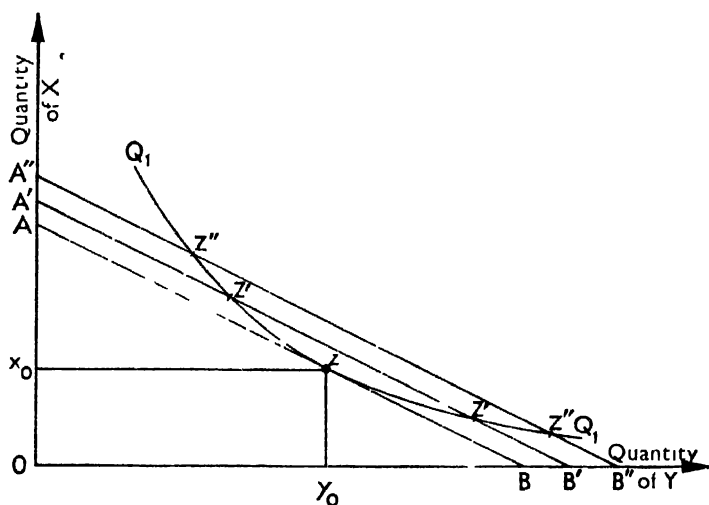


Figure 8.8

represented physical quantities of two factors of production,  $X$  and  $Y$ . When these are combined in some given amounts, say  $Ox_0$  of  $X$  and  $Oy_0$  of  $Y$ , the resulting output (at  $Z$ ) is, say,  $Q_1$  of the firm's product. Now this same quantity of product,  $Q_1$ , could also be produced by other combinations of  $X$  and  $Y$ , and these other combinations are represented by the points on the 'isoquant'  $Q_1Q_1$ , among which are  $Z'$  and  $Z''$ . To find which of these various possible ways of producing the output  $Q_1$  will be the cheapest, we need to

know the prices of  $X$  and  $Y$ . Let us assume for the moment that there is a fixed amount of money available to spend on  $X$  and  $Y$ , and that if it were spent entirely on  $X$  the amount  $OA''$  could be bought, while if it were spent entirely on  $Y$  instead the amount  $OB''$  could be purchased. Alternatively, this same amount of money would purchase any of the intermediate combinations of  $X$  and  $Y$  shown by the 'isocost line'  $A''B''$ . Thus for this amount of expenditure we could certainly produce the output  $Q_1$  (with either of the combinations of  $X$  and  $Y$  marked  $Z''$ ). But we could also do so if we reduced the total expenditure, say to the amount necessary to put us on the isocost line  $A'B'$ , and so on until we get the total outlay down to that which puts us on the isocost line  $AB$ . There is then no cheaper combination of  $X$  and  $Y$  than that given at  $Z$  which will produce the output  $Q_1$ . In general, the least cost method of producing any output is found by identifying the point where the isoquant relevant to that output is tangential to an isocost line.

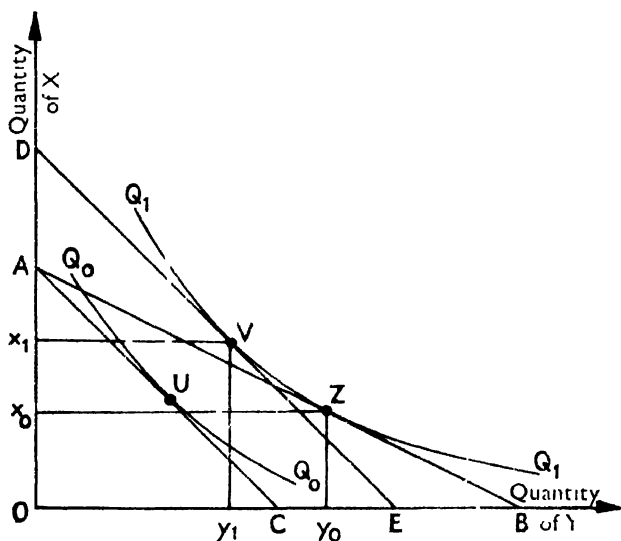


Figure 8.9

If a tax is now imposed on the factor  $Y$ , then for the same money outlay we shall get less of that factor than previously, so that the isocost line  $AB$  will be 'swung' to some such position as  $4C$  in figure 8.9, meaning that the maximum amount of  $Y$  that can now be purchased with that amount of money is  $OC$  instead of  $OB$ , with a

corresponding reduction in all the intermediate combinations. The largest output that can be produced at this level of costs is  $Q_0$  (for this is the isoquant that is tangential to  $AC$ ). In order to produce the output  $Q_1$  we shall need to spend more than previously, i.e. to shift  $AC$  successively further from the origin  $O$ , until it reaches some such position as  $DE$ , where it is tangential to the  $Q_1$  isoquant at  $V$ , indicating that the least-cost method of producing  $Q_1$  is now to use  $Ox_1$  of  $X$  and  $Oy_1$  of  $Y$  (i.e. less of the taxed and more of the untaxed factor, as we should expect). Total costs will have increased by the proportion  $\frac{AD}{OA}$ .

The analysis gets a little more complicated when some factor adjustments take a relatively long time to carry through. For instance, if the factor  $Y$  in the preceding analysis had been fuel, and the factor  $X$  capital equipment, then the tax on fuel leads to a change in the optimum combination of the two, in such a way as to make it desirable to purchase more capital equipment so as to economize on the use of fuel. This is how a substitution of capital equipment for fuel would come about. But it may take some time to get the new equipment ordered, built, and installed, and in the meantime the

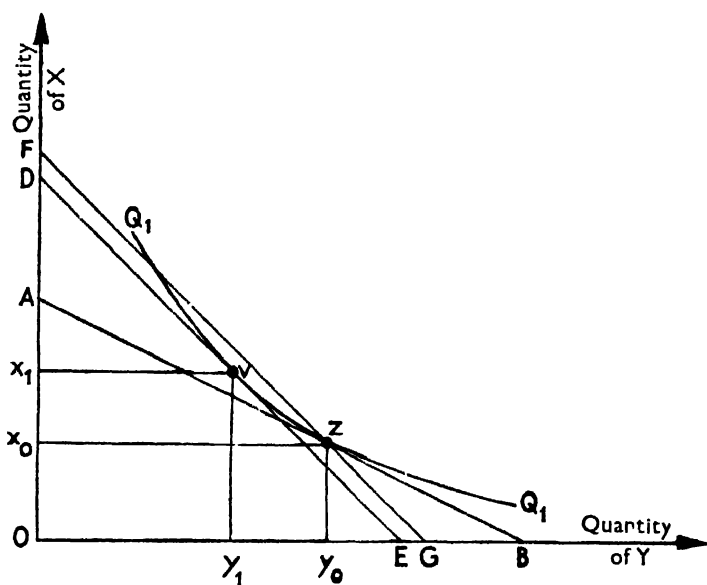


Figure 8.10



existing amount of capital equipment must be regarded as fixed. Thus, in figure 8.10, the factor  $X$  cannot be increased immediately above  $Ox_0$ , so that the tax which shifts the (long-run) least cost combination from  $Z$  on  $AB$  to  $V$  on  $DE$ , has the short-run effect of shifting  $AB$  to  $FG$ , with  $Z$  fixed. If the new capital equipment is put into operation gradually, then the pattern of adjustment will be a gradual movement from  $Z$  to  $V$ , with a corresponding reduction in total costs from the level represented by  $FG$  to that represented by  $DE$ .

This analysis works in a rather similar way in the converse situation. Using figure 8.10 again, let us now assume that  $V$  is the pre-tax situation, that factor  $X$  is a building, and factor  $Y$  machinery. If a tax is imposed on factory premises ( $X$ ) but none on  $Y$ , such that the optimum shifts from  $V$  to  $Z$ , this means that it is now more efficient to buy relatively more compact machinery (at a higher cost) and reducing the amount of factory space required. But if the building is there, and cannot quickly be turned over to other purposes, then in the short-run it is virtually costless, though in the long-run of course it is not. Thus although the long-run optimum has been changed, the short-run optimum is not, for the amount of factory space  $Ox_1$  is available free, while new machinery costs money. Thus the short-run cost lines are really the vertical lines from the  $y$  axis, such as  $Vy_1$  and  $Zy_0$ , but cut off at the existing amount of factory space,  $x_1$ . Thus in the short-run the cheapest way of producing  $Q_1$  remains the combination  $V$ , for to shift to  $Z$  immediately means spending extra money on machinery to save costless space.

## (ii) EFFECTS ON COSTS, OUTPUT AND PRICES

It will be clear from the foregoing that, even though substitution of untaxed for taxed factors may occur (especially in the long run), this will not prevent costs from rising somewhat as a result of the tax on a particular factor. Even if the factor ceases to be used altogether, the factors which replace it will not be perfect substitutes for it, so that the cost of production will still be raised.

The actual cost-raising effect of any given tax will depend upon the closeness of the substitutes available, and their prices relatively to that of the taxed factor. Thus, in figure 8.11,  $AB$  is again the original isocost line on which the optimum combination of  $X$  and  $Y$  for producing  $Q_1$  of the product is to be found. Similarly,  $V$  is the optimum combination of  $X$  and  $Y$  for producing this same output after the imposition of the tax which makes  $DE$  the relevant isocost line.

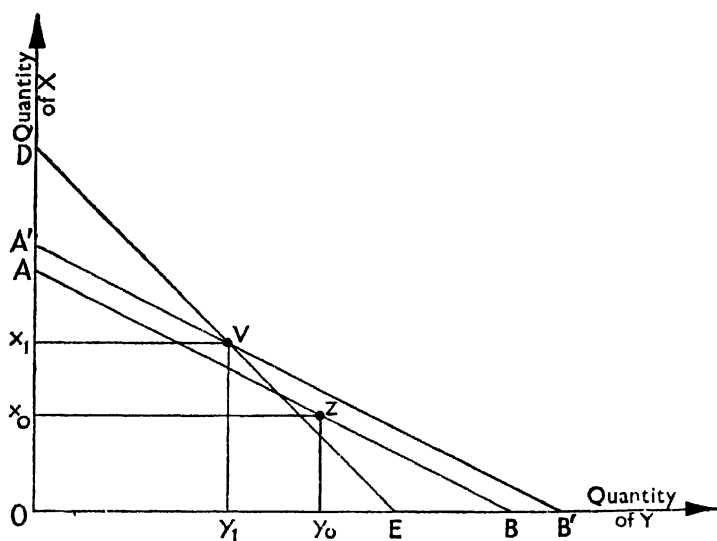


Figure 8.11

We have already seen that this means that costs increase in the proportion  $\frac{AD}{OA}$ , but not all of this increase is actual tax payment. In fact, the quantities  $Ox_1$  of  $X$  and  $Oy_1$  of  $Y$ , as represented by the point  $V$ , would have cost more (in the proportion  $\frac{AA'}{OA}$ ) even at the old prices before tax (i.e. if the relevant isocost line had been  $A'B'$ ), otherwise, of course, the combination  $Z$  would not have been the least-cost combination. Thus, of the total proportionate increase in costs by  $\frac{AD}{OA}$ , only the proportion  $\frac{A'D}{OA}$  represents actual tax payments, the rest, as has just been noted, being extra outlay on factors net of tax due to the substitution of  $X$  for  $Y$ . Thus costs rise by more than the tax yield. Only in the case where no substitution takes place will the rise in costs and the tax yield be the same.

The effects of the various kinds of cost increase upon output and prices have already been examined earlier in this chapter, and there seems little point in repeating those conclusions here. Instead, let us re-examine the assumption that the prices of factors (excluding tax) will remain unchanged after the imposition of the tax.

We have seen that, eventually and in general the imposition of a

tax on a particular factor of production will reduce the demand for that factor. If the price of the factor (net of tax) is to remain constant in spite of the reduction in demand for it, then the supply of that factor must be infinitely elastic at that price (at any rate over the range within which demand has fallen). The more inelastic is the supply of the factor, the more will its pre-tax price fall in the face of a given fall in demand. Nevertheless, so long as the pre-tax price does not fall by the full amount of the tax the gross price will still rise somewhat, and the conclusions of the foregoing analysis concerning the pattern of factor use will still be valid, although the extent of the readjustments will obviously be lessened. As regards the effects on costs, these will still rise as a result of the tax, but whether the increase of costs in the user firm is greater or less than the total tax payment depends on the extent to which the suppliers are forced to accept a reduction in their net revenues via the cut in the price (net of tax) of the taxed factor. The effects on price and output then depend, in the now familiar way, upon the nature and extent of the cost change.

### (E) TAXES ON PARTICULAR PRODUCTS

The final type of tax to be considered in this chapter is the tax on a particular product. If the 'particular product' is one used in the manufacture of some other good, then to its purchaser it is a tax on some particular factor, as analysed in the preceding section. If the 'particular product' is the only one produced by the firm in question, then as far as that firm is concerned it is either (i) a gross revenue tax, if levied on an *ad valorem* basis, or (ii) a variant of the gross revenue tax which shifts the *AR* and *MR* curves downwards parallel to themselves instead of proportionately, if the tax is levied on a unit basis. On the other hand, if the tax falls on only one of the goods produced by the firm, then there will obviously be a discriminatory effect between different lines. More generally, since the tax will not be uniform over all products, it will have a discriminatory effect between firms and between industries. But in any case, from the micro-economic viewpoint, the analysis of the preceding sections can be employed to investigate it, and from a macro-economic viewpoint the analysis of Chapter XII will be relevant.

The 'particular product' may, however, be one that is purchased by 'final consumers', i.e. 'persons' who are not 'businesses'. Instances of this kind of tax would be taxes on foodstuffs, alcoholic drinks, tobacco, clothing, entertainment, etc. Many taxes fall both

on 'producers' goods' and on 'consumers' goods', such as property taxes, and taxes on fuel and motor vehicles. As far as the analysis of their impact upon the producing firms is concerned, the preceding analysis is still relevant, but for consumers a different set of considerations arise, and it is to these that we turn in the next chapter.

## CHAPTER NINE

### The Impact of Business Taxes upon Individuals as Consumers

From the analysis in Chapters VII and VIII we have seen that it is possible for business taxes of all kinds (and not simply those levied on consumers' goods) to affect individuals as consumers by changing the relative prices of the commodities they buy. In addition, such taxes may affect personal incomes, via induced changes in the demand for factor services, and so on, but all these repercussions will be left aside for the time being, and taken up again in Part B, when our attention will be concentrated upon economy-wide adjustments, rather than upon the position of the individual.

In this chapter we shall compare the effects upon a consumer of price changes brought about by business taxes, with the effects of a personal direct tax having the same yield from that consumer. It will be appreciated that this is a very limited sort of comparison, and although, for conciseness of exposition, the conclusions drawn will be stated categorically, stripped of the qualifications necessitated by the restricted frame of reference, the simplifying assumptions upon which the analysis is to be based will be stated explicitly at the outset, and should be borne in mind throughout.

The relative merits of direct and indirect taxation from the point of view of the individual consumer have been the subject of what must be the most famous controversy in the field of public finance. The argument has been mainly concerned with answering the following question: assuming that a certain sum of money is to be taken from a particular individual by taxation, will that individual be better off if the tax levied on him is a direct one or an indirect one? It is to this problem that this chapter is devoted.

#### (A) THE SIMPLE CASE

The analysis has in the main been concerned only with simple proportional taxes, and has been based on the following important assumptions: (i) that no taxes other than those under immediate consideration are being levied; (ii) that the individual's pre-tax

income is unaffected by either tax; (iii) that the indirect tax simply results in an increase in the price of the taxed good by the full amount of the tax; and that the basic prices (net of tax) of the various goods bought by the individual are unaffected by either tax; and (iv) that individuals have no direct preferences concerning direct or indirect taxation as such. Under these conditions it can be shown that the individual will prefer a direct to an indirect tax.

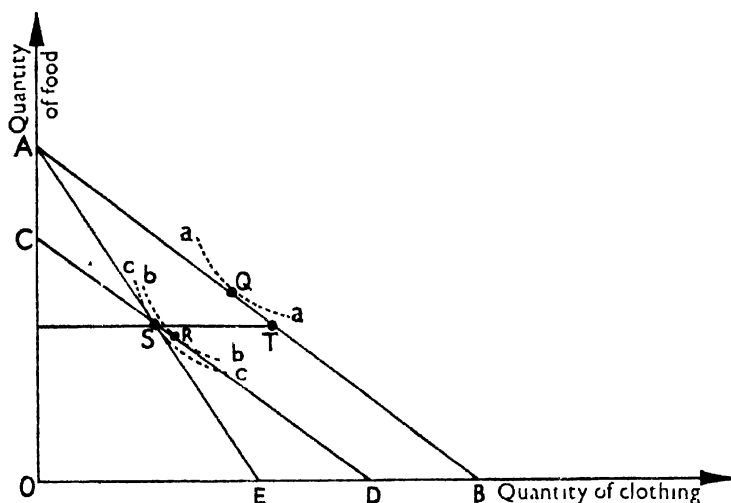


Figure 9.1

Consider, for instance, the situation depicted in figure 9.1, where the co-ordinates are the same as with the comparable analysis of a lump-sum tax in figures 2.1 and 2.2 earlier. The individual's pre-tax income enabled him to buy any of the combinations of food and clothing represented by  $AB$ , of which the combination  $Q$  is preferred (it being the one where  $AB$  is tangential to the indifference curve  $aa$ ). If a tax is now imposed on clothing which results in its price being raised by the full amount of the tax, then the maximum amount of clothing which can be bought with the given income will fall correspondingly, say from  $OB$  to  $OE$ , with pro rata reductions for all the intermediate quantities, so that the new possibility line is  $AE$ , instead of  $AB$ . Now if the preferred combination on  $AE$  is  $S$  (where  $AE$  is tangential to the indifference curve  $cc$ ), then the tax yield at this point (measured in terms of clothing) is  $ST$ . An income tax with this same yield would produce a possibility line (through  $S$ )

of  $CD$ , where  $DB = ST$ . Since this line must intersect the indifference curve  $cc$  at  $S$ , it must itself be tangential to a higher indifference curve, such as  $bb$  at  $R$ . Thus the position  $R$  must be preferable to the position  $S$ , hence a direct tax will be preferable to an indirect tax of the same yield.

In succeeding sections of this chapter this contention will be re-examined within a wider frame of reference, in which the assumptions listed at the beginning of this section will be relaxed in turn to see what difference each makes to our conclusion.

### (B) THE CASE WHERE TAXES ARE ALREADY BEING LEVIED

Firstly, what if the direct vs. indirect tax comparison is to be superimposed upon a pre-existing tax structure? For practical purposes this is likely to be a more relevant framework of analysis, since it will usually be marginal adjustments in the tax structure that are being considered, not all-or-nothing comparisons.

One additional complication that arises here, and which requires immediate clarification in this new context, is the meaning of the 'equal yield' condition. The imposition of a new tax will usually affect the yields of existing taxes to some extent, so that the 'equal yield' condition must take into account not only the actual yield of each of the new taxes, but also their respective effects upon the yield of the old ones.

As regards the existing tax structure, there are several distinct possibilities, as follows:

- (i) a pre-existing income tax;
- (ii) a pre-existing tax on clothing;
- (iii) a pre-existing tax on food;

or some combination of two or more of these three. No attempt will be made to deal with the combinations here, since their implications can easily be worked out from the 'pure' cases.

The pre-existing income tax presents no serious complications at all, since it merely means that we consider the line  $AB$  in figure 9.1 to be equivalent to the line  $CD$  in figure 2.2 earlier, and the analysis is then conducted precisely as in the preceding section of this chapter.

With a pre-existing tax on clothing, the only difference from the earlier analysis lies in the implications of the equal-yield condition, as already mentioned. In figure 9.2, the pre-tax situation is represented by  $AZ$ , and  $AB$  represents the situation with the pre-existing

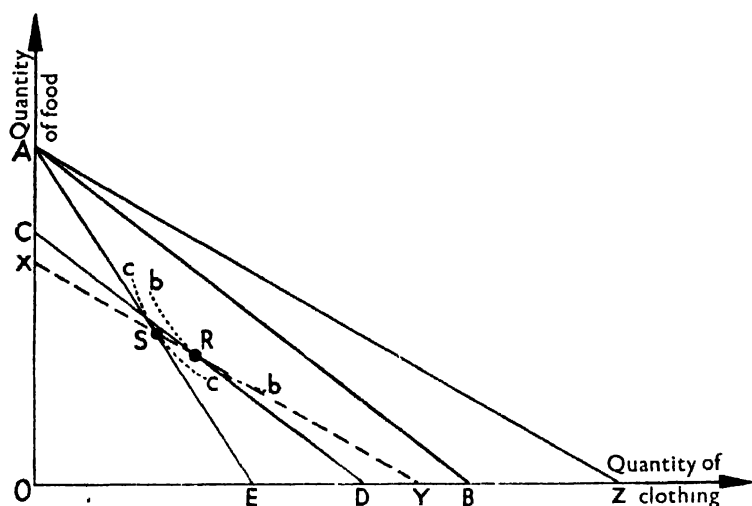


Figure 9.2

tax on clothing. The choice is then to be made between an additional tax on clothing or an income tax, assuming that the total tax yield in each case is the same (i.e. the yield of the existing tax on clothing plus that of the additional tax on clothing is to equal the yield of the existing tax on clothing plus that of the income tax). In terms of figure 9.2 this means that the two chosen points must both lie on a line parallel to  $AZ$ . Thus if  $AE$  represents the post-tax possibility line under the additional tax on clothing, and the point  $S$  (where  $AE$  is tangential to the indifference curve  $cc$ ) is the chosen point on it, then the point chosen under the income tax must lie somewhere on  $XY$ , which is a line through  $S$  parallel to  $AZ$ . Now the post-income-tax possibility line will be parallel to  $AB$ , and will therefore intersect  $XY$  at a narrower angle than does  $AE$ . If it is to be tangential to an indifference curve somewhere along  $XY$ , then it must be so somewhere between  $S$  and  $Y$ , for between  $S$  and  $Z$  the indifference curves will be intersecting  $XY$  at greater angles than at  $S$ , not lesser ones. Thus the post-income-tax possibility line,  $CD$ , must intersect  $XY$  at some such position as  $R$ , where it is tangential to an indifference curve such as  $bb$  in figure 9.2. Clearly,  $bb$  is a higher indifference curve than  $cc$ , meaning that  $R$  is preferred to  $S$ , or, in more general terms, the direct tax is preferred to the indirect tax (as before).

The final case (iii), of a pre-existing tax on food, has to be divided into three sub-cases as follows :



- (a) where the pre-existing tax on food is at a higher rate than the new tax on clothing;
- (b) where both taxes are at the same rate;
- (c) where the pre-existing tax on food is at a lower rate than the new tax on clothing.

Each of these sub-cases will be dealt with in turn.

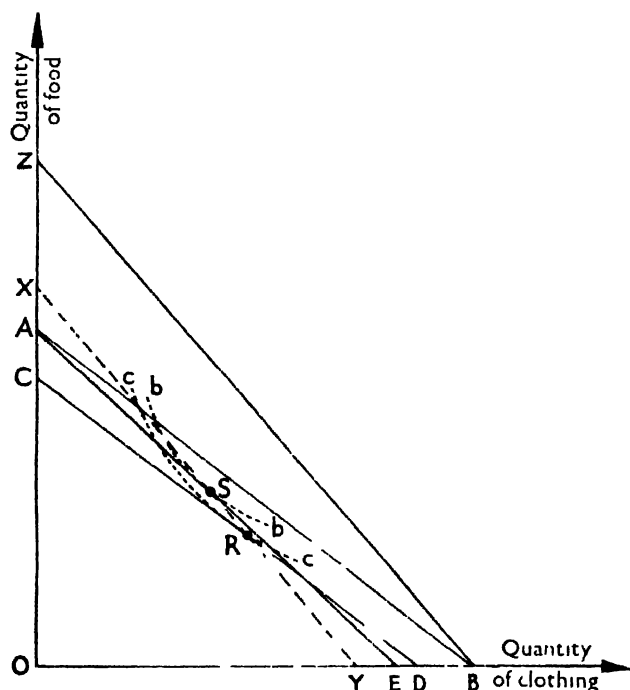


Figure 9.3

In figure 9.3 is depicted the first of these three sub-cases.  $AB$  is the possibility line after taking account of the pre-existing tax on food, while  $AE$  is the possibility line generated by the tax on clothing (at a lower rate than the tax on food). If  $S$  (the point where  $AE$  is tangential to the indifference curve  $bb$ ) is the chosen point with the clothing tax, then for the income tax optimum point to have the same tax yield it must lie somewhere on the line  $XY$ , which is parallel to  $ZB$  (the pre-tax possibility line) and passes through  $S$ . Since the income tax line will be parallel to  $AB$ , it will obviously intersect  $XY$  at a

greater angle than does  $AE$ , and, by analogy with the earlier reasoning, must be tangential to an indifference curve (such as  $cc'$ ) at some point between  $S$  and  $Y$  (such as  $R$ ). Clearly  $S$  is better than  $R$  for the individual, hence he will prefer the indirect to the direct tax in this situation, a conclusion opposite to that which we have reached hitherto.

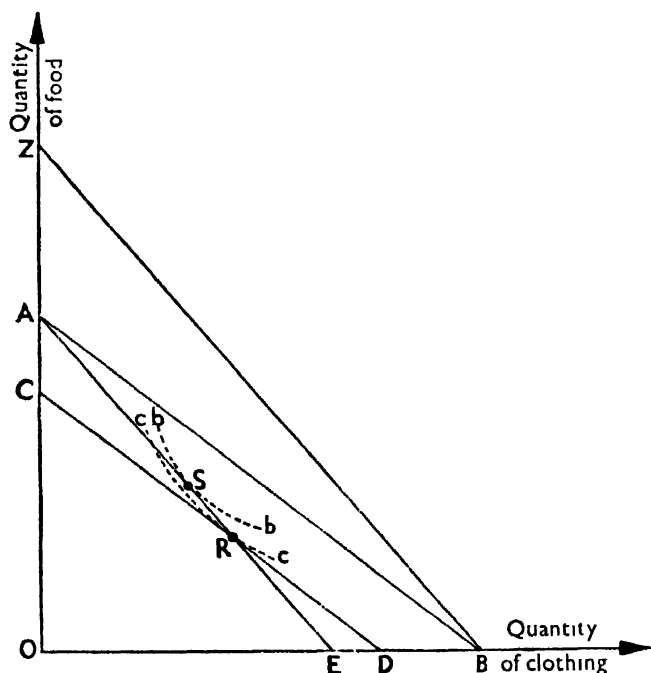


Figure 9.4

In the second sub-case, where both of the indirect tax rates are the same,  $AE$ , the consumption possibility line after the imposition of the tax on clothing in addition to the pre-existing tax on food, will be parallel to the no-tax line  $ZB$ , as shown in figure 9.4. If  $S$  is the chosen point thereon, the equal-yield condition requires that the income tax optimum must also lie on  $AE$  (for  $AE$  coincides with the line  $XY$  as drawn in figure 9.3 in this case). We know already that  $S$  is the best of all the positions on  $AE$ , so that the income tax position, such as  $R$  on  $CD$ , must be inferior. Once more then we find that the earlier conclusion is reversed, and the indirect tax is preferred to the direct tax.

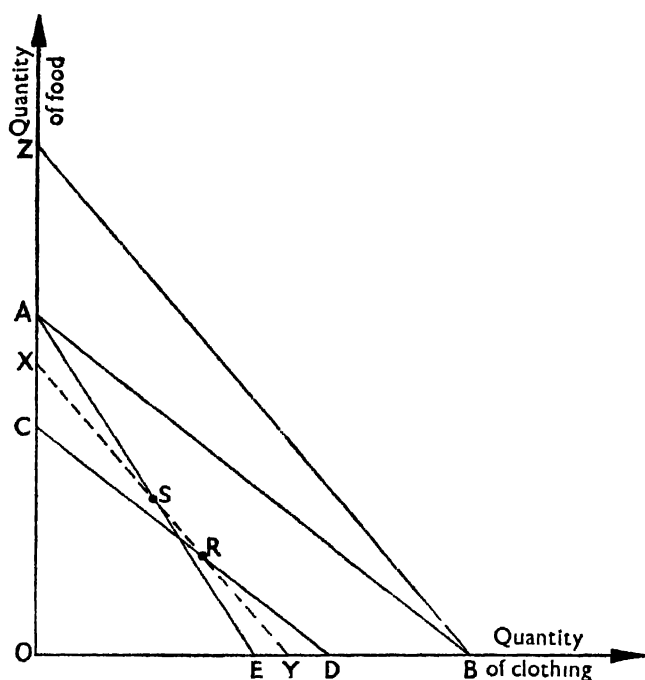


Figure 9.5

In the third sub-case, where the existing tax on food is at a lower rate than the new tax on clothing, nothing can be said *a priori* about the relative merits of the direct and the indirect tax. As will be seen from figure 9.5, the respective chosen points, *R* and *S*, are so related to each other that it would be possible for the indifference curve that passes through the one to pass above, through, or below the other, according to the particular preference pattern of the individual concerned. Thus some individuals in this situation will prefer the direct to the indirect tax, some have the opposite preference, and others be indifferent between them.

The general conclusion to be drawn from the analysis of this section is, therefore, that the nature of the existing tax structure will be crucial in determining whether a direct or an indirect tax will be preferred by any individual, even if all the other restrictive assumptions mentioned earlier are satisfied.



income tax, whereas here the comparison is between an indirect tax and a direct tax (it being assumed once more that no other taxes are being imposed). We shall therefore ignore saving, as we have done throughout this chapter, and concentrate on two consumer goods (one taxed and one untaxed) and leisure (representing inversely the supply of effort). The diagrammatic analysis is formally the same as in figure 4.11 above, and the details of the argument as conducted there will not be repeated here, but may be referred to by any reader for whom the present summary treatment proves inadequate. The different context requires only the substitution of the untaxed good 'food' for 'saving' on the vertical axis, and the replacement of 'consumption' by the taxed good 'clothing' on the diagonal axis, with the plane  $dyz$  becoming the possibility plane after the imposition of the tax on clothing (instead of on expenditure). The result is figure 9.6.

The pre-tax possibility plane  $xvz$  is shifted to  $dyz$  by the tax on clothing, and let us suppose that the chosen point on this plane lies somewhere along the line  $y_1z_1$ . The plane  $efg$ , drawn through this line and parallel to the  $xvz$  plane, gives all the points at which the tax yield is the same as on  $y_1z_1$ , so that the point chosen on the income tax plane must lie somewhere on  $efg$  too. The income tax reduces the amounts of both goods that can be bought, and results in some such possibility plane as  $abz$ , which intersects the equal-tax-yield plane  $efg$  along the line  $a_1b_1$ , so that the chosen point under the income tax must lie somewhere along this line if the equal-yield condition is to be fulfilled.

Ignoring the special case of the point  $p$ , there are three possible outcomes:

- I. The individual chooses to be in the range  $a_1p$  with the income tax and in the range  $y_1p$  with the tax on clothing;
- II. The individual chooses to be in the range  $a_1p$  with the income tax and in the range  $z_1p$  with the tax on clothing;
- III. The individual chooses to be in the range  $b_1p$  with the income tax and in the range  $y_1p$  with the tax on clothing.

Under Case I, more effort will be supplied (i.e. less leisure enjoyed) with the indirect than with the direct tax. This sort of situation would arise if the taxed commodity were strongly complementary with leisure, for then the tax, by reducing the relative attractiveness of the taxed commodity, would also reduce the relative attractiveness of the leisure required to enjoy it. (Similar conditions apply to Case III below.) The indirect tax on clothing will also lead in this case to

more food being bought than with the income tax. But it nevertheless cannot be determined *a priori* which of the two taxes the individual will in general prefer. It is therefore an open question in this case whether direct taxes are better than indirect taxes, or vice-versa.

Under Case II a more definite conclusion is possible. Not only can it be said that the direct tax will lead to more effort being supplied than will the indirect tax, and that the latter tax will lead to a lower consumption of clothing than will the former, but the position chosen under the income tax (along  $a_1p$ ) will definitely be preferred by the individual to the position he chooses (on  $z_1p$ ) under the tax on clothing. Hence, the direct tax is preferred to the indirect tax in this case.

Case III is analogous to Case II, but with the opposite result, i.e. the individual will definitely prefer the indirect to the direct tax.

Our general conclusion is, therefore, that in some circumstances the direct tax will definitely be preferred to the indirect tax, in others the reverse will be true, and in yet other circumstances it will be impossible to draw any hard and fast conclusions without knowing the precise preference structure of the individual. It will therefore be seen that once one allows for variations in factor supplies by consumers it is again impossible to reach firm conclusions about the relative merits of direct and indirect taxes from the standpoint of the individual.

#### (D) OTHER CONSIDERATIONS

Chapters VII and VIII were concerned, among other things, to trace out the possible effects upon product prices of various business taxes. The general conclusion that emerged was that, in general, such taxes will in fact lead to changes in product prices, but not by the exact amount of the tax. The taxes may also affect factor rewards, and thus have further repercussions, through changes in the relative price structure, upon the prices of untaxed goods, and upon the prices (net of tax) of the taxed goods. A very awkward question then arises concerning the precise meaning to be attached to the concept of the amount of tax paid by any individual. Even in the relatively simple case of a tax on a particular commodity it can no longer be taken to be the amount of the taxed commodity bought multiplied by the rate of tax on that commodity. This would certainly give the 'formal' incidence of the tax, but it is based on the assumption that the tax is shifted entirely onto the consumer and has no other effects on the situation confronting him. What we need to know, if we are

to apportion the 'tax yield' sensibly, is the 'true' incidence of the tax, and we shall see later (in section (B) of Chapter XI) that to assess this is no easy task. Thus if we drop the third assumption mentioned at the beginning of section (A) of this chapter, it becomes impossible to conduct a satisfactory micro-analysis of the relative effects of direct and indirect taxation at all.

Finally, of course, the individual may have crucial attitudes towards direct and indirect taxation as such, irrespective of the implications of particular taxes for the choices confronting him as a consumer. For instance, he may believe that direct taxes are preferable to indirect taxes because with the former 'you know where you are' and they are 'fairer'. Another individual may of course hold the opposite viewpoint, asserting perhaps that because indirect taxes are diffuse and inconspicuous they are therefore felt less keenly. Considerations of this sort have to be put alongside those based on the sort of analysis of consumers' choice that has been conducted here, for each will usually weigh to some extent with each individual. In some cases the consumer's choice aspect may outweigh the other, in some cases it will take second place, and in some cases each will reinforce the other.

In the last resort it is necessary to step outside the framework of individual choice, not only to take account of the wider ramifications of the imposition of a particular tax, but also in order to make judgments about social as opposed to individual welfare. At this level, the preferences of individuals become part of the data in the problem of social choice, to be considered alongside other aspects of the problem that we have so far neglected, such as the potentialities of the respective taxes as instruments of stabilization policy, as redistributive agents, as promoters or retarders of economic growth, etc. It is against this background that the direct-indirect tax controversy has to be considered, if it is to be seen in perspective.

## CHAPTER TEN

### Government Expenditure

The analysis of Government expenditures is seldom as exhaustive or as enlightening in textbooks on public finance as is the treatment of taxation. Where attention is directed to it, it is often focussed on the problem of determining the best level or composition of expenditure, on the difficulties involved in devising rational criteria of choice, and on the decision-making mechanisms needed to give them effect. None of these problems will be considered here, important though they are, because the primary interest of economics is to analyse the *effects* of such decisions, however they are made and however wise or foolish they may be. Nor will any consideration be given to the administration of Government finances, or to the legal or constitutional aspects of the problem. In this way, the purely economic principles can more easily be laid bare, but these principles, and the conclusions to which they lead, must then be tempered by a careful assessment of their importance relatively to these excluded aspects of the problem in the actual situation that is being analysed.

The classification of Governmental expenditures for purposes of economic analysis will not, in general, coincide with the classifications adopted for other purposes. In particular, the way such items are presented in Governmental accounts should not be accepted without further scrutiny, for the prime consideration there is often budgetary control or accountability, so that the categories are based on legal or administrative criteria and not on economic considerations. For the present analysis the following broad classification will be used :

- (a) Transfers in cash or in kind—to persons
- (b) Transfers in cash or in kind—to firms
- (c) Transfers in cash or in kind—to other governments
- (d) Purchases of goods and factors

The essential difference between a 'transfer' and a 'purchase' is that the former is a one-way transaction, with no *quid pro quo* from the recipient, whereas a purchase involves the supply of some good or service *in exchange for* the payment made by the Government.



## (A) DIRECT TRANSFERS TO PERSONS

Direct transfers to persons include such payments as social security benefits for unemployment, sickness, old age, etc. They are formally similar to direct taxes on persons, though negative instead of positive, but the conditions associated with them may make for significant differences in their effects. Initially, attention will be concentrated upon the analytical similarities, the differences being introduced subsequently.

## (i) LUMP-SUM TRANSFERS

The analysis here is precisely analogous to that of Chapter II, and all we need to do is to reverse the direction of change. Thus, using figure 2.2, the shift from  $AB$  to  $CD$  is turned into a shift from  $CD$  to  $1B$ , and similarly for the subsequent analyses of the effects on saving and effort. For instance, the effects of a lump-sum transfer

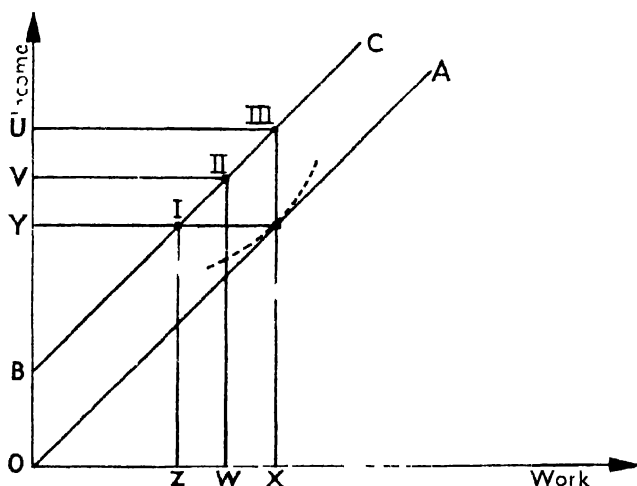


Figure 10.1

upon the supply of effort, as set out in figure 10.1 corresponds to that of figure 2.11 earlier, and similar conclusions emerge. The lump-sum subsidy shifts the possibility line from  $OA$  to  $BC$  (the amount of the subsidy being  $OB$ ), and this may, in principle, lead to various outcomes in terms of the amount of work done and income earned, according to the preferences of the particular individual. If, in the

no-subsidy situation, the individual had done  $OX$  work for  $OY$  income, the lump-sum subsidy may lead him to choose positions on  $BC$  such as I (where he gets the same total income but now has to work less for it) or II (where work is reduced, but total income increases) or III (where the amount of work remains unchanged so that total income simply rises by the amount of the subsidy). In extreme cases, the individual may even choose to be to the left of I or to the right of III.

Another interesting case is that of the effect of a lump-sum transfer (e.g. an old age pension paid at a fixed rate to everyone who reaches a certain age) upon the volume of saving. Here the analysis is similar to that of figure 2.6, adapted in figure 10.2 to meet the

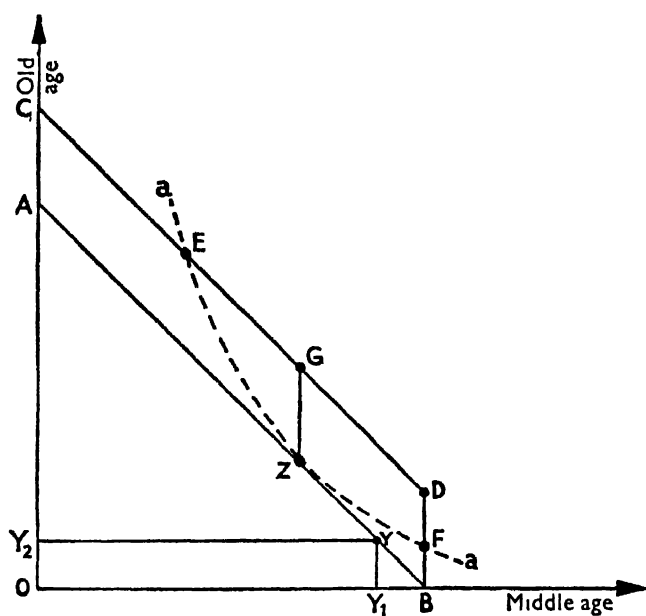


Figure 10.2

circumstances of this particular case. The two periods considered here are 'middle age' (instead of 'this period') and 'old age' (instead of 'next period'). The lump-sum subsidy is paid only during 'old age', and we will assume that it cannot be 'anticipated' by borrowing against it during middle age. It will also be assumed that income (excluding subsidy) expected during old age is very low ( $OY_2$ ) relatively

to that of middle age ( $OY_1$ ). The rate of interest will be assumed to be zero, just to keep the analysis simple.  $AB$  (in figure 10.2) represents the initial consumption possibilities open to the individual. The lump-sum subsidy of  $AC$  ( $= BD$ ) increases the consumption possibilities for the period of old age but not during middle age (hence the 'cut-off' at  $DB$ ). If the originally chosen point on  $AB$  had been  $Z$  (where  $AB$  is tangential to the indifference curve  $aa$ ), then the newly chosen point on  $CDB$  may be anywhere between  $E$  and  $D$  (it is hardly likely to be between  $D$  and  $F$ ). This means that saving may be increased (if the newly chosen point lies between  $E$  and  $G$ ), decreased (between  $G$  and  $D$ ), or remain the same (if  $G$  is the chosen point).

Thus the same wide range of possibilities occurs here as with the lump-sum tax, and, *mutatis mutandis*, the general conclusions of section (F) of Chapter II hold here too. They will be relevant to any lump-sum *per capita* payment made directly to persons, although such payments do not normally constitute a major part of any system of transfers.

#### (ii) SIMPLE PROPORTIONAL TRANSFERS

Some transfers are proportional to income, for instance where unemployment benefits or pensions are related to past earnings. Here again we can follow the general lines of the earlier analysis of the corresponding taxes, set out in section (A) of Chapter III. If, in

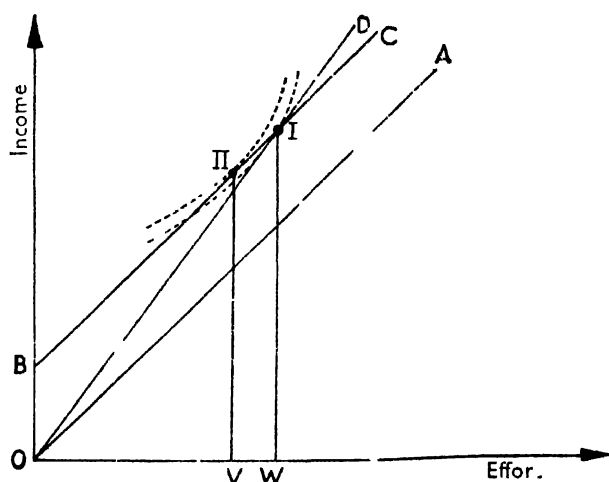


Figure 10.3

particular, we again take up the effect on the supply of effort, we find that the analysis of figure 3.5 can be used with a simple reversal of the shift (i.e. make it from  $OD$  to  $OA$ ), and with the same range of possible outcomes as in the lump-sum case. However, if we compare the proportional subsidy with a lump-sum subsidy of equal amount, it will be seen (in figure 10.3) that more work will be done in the case of the simple proportional subsidy than in the lump-sum case. As one would expect, this is precisely the opposite conclusion to that reached in the case of the corresponding tax comparison (see figure 3.6). However, it should be noted that the individual will still feel better off in the lump-sum case (for in figure 10.3, as in figure 3.6, II is preferred to I).

### (iii) MORE COMPLICATED TRANSFERS RELATED TO INCOME

Many kinds of transfer bear a more complicated relationship to income than those we have just considered. For instance, it is common to pay those social security benefits that are intended to relieve poverty as such by making up to some minimum figure whatever income is actually being earned by the individual. In most cases the individuals receiving such supplementation are not in an equilibrium position, because they are not just able to work as much as they would like (because the work is just not available, or because they are sick, etc). But where such poverty is due to a *preference* for a low level of income and a small supply of effort, the effects of such provisions

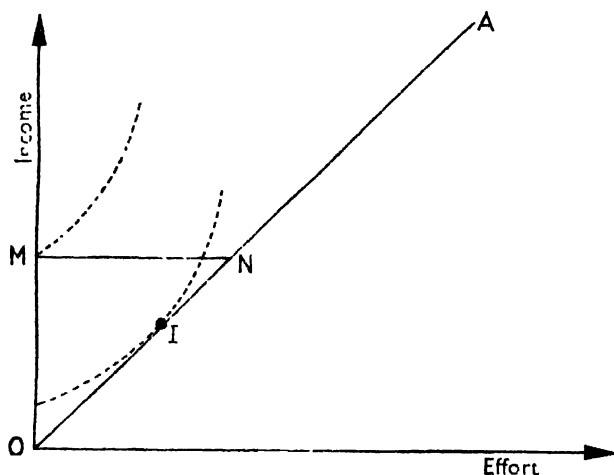


Figure 10.4

(as shown in figure 10.4) may well be to reduce the supply of effort still further. If  $OM$  is the level of income to which supplementation is made, then the post-subsidy income line becomes  $MNA$ , and it may well be that the individual chooses the point  $M$  on this line, as shown in figure 10.4, instead of the point  $I$  where he was assumed to be in the absence of the subsidy.

Alternatively, there could be a subsidy which bore an inverse relationship to income, being at some fixed sum when income was zero, then diminishing by some proportion of income as income rose, until the subsidy became zero at a certain level of income. Such a

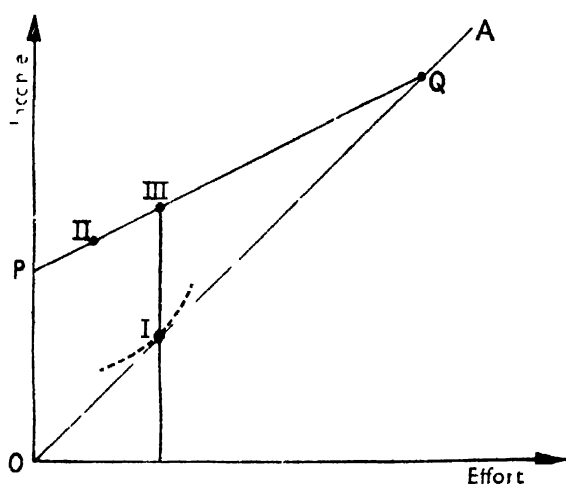


Figure 10.5

subsidy is analysed in figure 10.5, where the subsidy is  $OP$  when income is zero, falling steadily as income rises from  $O$  to  $Q$ , and becoming zero when income is at or above  $Q$ . This graduated supplementation may have the same effect as was noted in the previous case (i.e. the point chosen on  $PQA$  may be  $P$ ) but it is also possible that the chosen outcome will be  $II$  (where some, though less, work is done) or  $III$  (where the same amount of work is done).

If these various types of subsidy are compared on an equal-amount basis, then it will be seen, as in figure 10.6, that the amount of work done will be lowest (at  $M$ ) with the type of subsidy which supplements income to some fixed minimum, and highest (at  $III$  on  $PQ$ ) with the graduated type. It would, of course, be higher still (at  $II$  on  $LM$ ) with a lump-sum subsidy of the same amount. However,

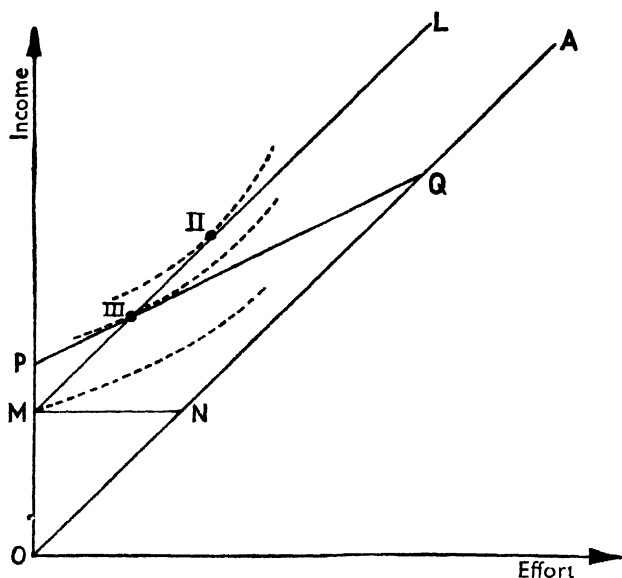


Figure 10.6

it is quite conceivable, in the special sort of case that we have been considering, that there is in fact no difference between any of them, since the individual who has a very low preference for income and an intense dislike of work may have an indifference map of the sort

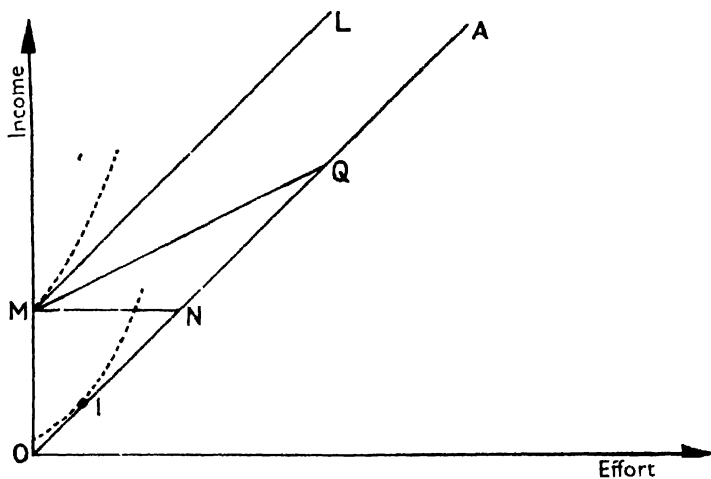


Figure 10.7

shown in figure 10.7, so that all three systems of subsidy-payment reduce to the same thing as far as he is concerned . . . he simply moves from *I* to *M*. Alternatively, it is possible that some individuals, though not willing to work enough in order to reach the socially-established minimum income, nevertheless do not work any less when the subsidy raises them up to it. Thus, in figure 10.8

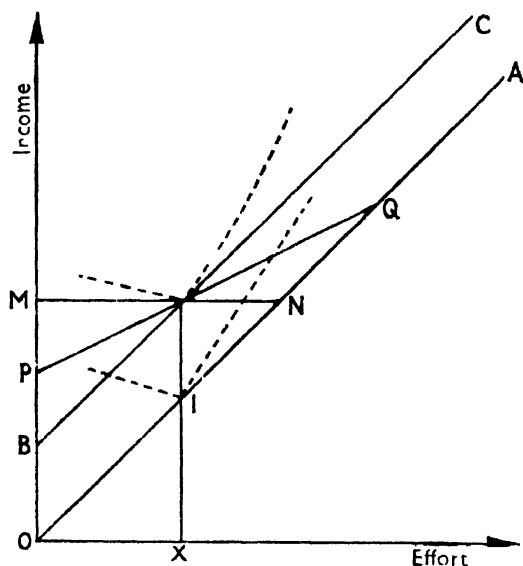


Figure 10.8

this sort of individual is represented by indifference curves which are 'kinked' at the amount of work  $OX$ . This sort of person is one who has fixed ideas about the amount of work he wants to do, and who not only has a strong aversion to doing any more than this, but also dislikes doing less! For him, therefore, the swings in the income-possibility lines have to be extremely large before he can be persuaded to budge from his chosen amount of effort  $OX$ .

These extreme cases may not be very common phenomena, but they do illustrate rather well the flexibility of the analytical tools, and the dangers of accepting the more commonly treated cases as if they are the only possible ones.

#### (iv) OTHER PERSONAL TRANSFERS

There is a class of transfer to persons which has no precise equivalent among the taxes analysed earlier, and this is the type of subsidy

paid to a certain class of individuals (say those whose incomes are below a certain level, or those who have children below a certain age) but related to certain kinds of purchases. Examples of these are coupons entitling poor people to cheap fuel, or old people to cheap tobacco, or parents of young children to cheap milk, or the blind to cheap transport. These transfers are direct, in the sense that they are related to the status of the individual, but indirect in the sense that they are tied to a particular transaction that he has to make to qualify for the subsidy. Thus, for the individuals who qualify for them they are equivalent to a negative indirect tax. They make the subsidised commodity or service cheaper than it would otherwise be (and cheaper than it is to those who do not qualify for the subsidy) with consequent discriminatory effects on the volume and pattern of consumption, etc., analogous to those that arise from the shifts in relative prices associated with the business taxes analysed earlier (in Chapter IX). The obvious complicating factor with this kind of subsidy is that besides its (intended) substitution effect, encouraging consumption of the subsidised good or service, it also has an income effect, releasing purchasing power for other (and more general) uses, thereby increasing demand for other goods and services (perhaps even leaving the demand for the subsidised commodity unchanged).

### (B) TRANSFERS TO BUSINESSES

Transfers to businesses can be classified and analysed along much the same lines as were taxes on businesses in Chapters VII and VIII. Thus we can distinguish those subsidies which are reductions in fixed costs, those which reduce variable costs, those which augment profits (or reduce losses) directly, those which reduce the prices of particular factors, and those which add to gross revenue, etc. For instance, a fixed Governmental grant to reimburse part of the initial outlays incurred in research or development of a new product will reduce the fixed costs associated with that product. If the Government provides, at less than cost, some of the variable inputs (such as fuel, perhaps) involved in a certain process, then it is effectively reducing the variable costs of that process. If the Government agrees to meet deficits incurred in the operations of some (perhaps nationalised) industry, say on a percentage basis and/or subject to some upper limit, then the effects will be analogous (though opposite) to a tax on net profits. If the Government subsidizes the purchase by farmers of particular fertilizers, etc., this is analogous (though opposite) to a tax on a particular factor of production. Finally, if the Government



agrees to pay a producer a fixed sum per unit of output sold (or to add a fixed percentage to whatever price he receives), then this is analogous (though opposite) to a tax on gross revenue. In all of these cases the appropriate parts of the analysis of Chapters VII and VIII can be applied, with the necessary changes in direction and terminology.

There are some transfers to businesses, however, which have no exact counterpart in the field of business taxation. Notable examples are to be found in the field of agricultural price supports. A typical arrangement here is for the Government to guarantee some minimum price to the producer, and if the actual price on the market turns out to be lower than this, the Government makes up

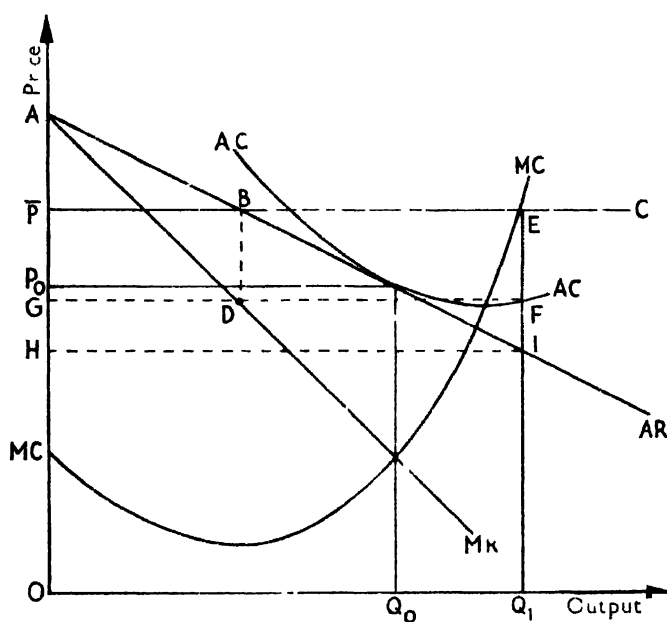


Figure 10.9

(all or part of) the difference. In figure 10.9 a short-run analysis of this situation is depicted. The producer was initially in equilibrium with an output  $OQ_0$ , which was sold at a price  $OP_0$ , at zero profit (since at the output where  $MR = MC$ ,  $AR = AC$ ). Now let us suppose that the Government guarantees a minimum price of  $O\bar{P}$  for this product. The producer will then find that his average revenue curve



relevant demand conditions here are shown by the segment  $L.AR$  of the demand curve. Since the receipt of  $O\bar{P}J\bar{Q}$  for  $O\bar{Q}$  is assured no matter what the price in the market, then the optimum level of output should be determined treating this receipt as a fixed element in the problem. Hence the process of profit maximization can start afresh from the output  $O\bar{Q}$ , treating  $L.AR$  as the demand curve, and constructing a new marginal revenue curve ( $L.\bar{M}R$ ) associated with it. The marginal cost curve will remain the same, but the average cost curve will not be relevant beyond the point  $K$  (i.e. past the output  $O\bar{Q}$ ), because the implication of treating the revenue from the guaranteed output as a fixed element in the problem, is that all the fixed costs will have been charged against that revenue, so that beyond  $O\bar{Q}$  it is only the variable costs indicated by the marginal cost curve that are a charge against revenue. It will be seen that the producer will once more increase his output, but only to  $OQ_2$  in figure 10.10, where (at  $U$ ) marginal revenue equals marginal cost. This additional output  $QQ_2$  will fetch a price  $OP_2$  on the market, but the producer's total revenue from these sales ( $OP_2RQ_2$ ) will be augmented by the subsidy payment of  $P_2\bar{P}JS$  in respect of the output  $O\bar{Q}$ . The producer's profit will have risen from zero (in the no-subsidy case) to the sum of  $N\bar{P}JA$  (the profit on the subsidized part of his output) plus  $LTU$  (the profit on the unsubsidized part). Thus, in the situation as depicted in figure 10.10, if the Government wishes to restrict output to a maximum of  $OQ_0$ , it is not sufficient to impose a quota in excess of which no subsidy will be paid, it will be necessary in addition to make the subsidy payment conditional upon total sales not exceeding the required level. Where the maximum permitted sales are  $OQ_0$ , the market price will be  $OP_0$ , so that the subsidy payment will fall from  $P_2\bar{P}JS$  to  $P_0\bar{P}JM$ , and the producer's profit will be the same on the subsidized part of his output, but only  $LT'V'$  on the unsubsidized part. It will be seen, therefore, that even with these relatively simple types of price support, a wide variety of short-run effects upon consumer prices and upon output are possible, according to the exact terms of the subsidy arrangement and the cost and demand conditions confronting individual producers. The implications of all these adjustments for factor use will be obvious.

### (C) TRANSFERS TO OTHER GOVERNMENTS

This is a class of transfer which differs in function from those that we have been considering so far, but which can nevertheless be

analysed in surprisingly similar terms. Transfer payments to other governments may be by way of aid, say for programmes of economic development being carried out by other sovereign States, or as a subvention towards the general activities of other governments within the same country (e.g. Federal-State or State-Local transfers in a federal system, or central-local in a unitary system) or towards some particular service in that same situation. From our point of view the constitutional and political relationships between the grant-giving and grant-receiving governments are only important to the extent that they determine, or influence, the nature of the transfer payment and the conditions attaching to it. Once this is fixed, what we are interested in here are the effects of such transfers upon the behaviour of the receiving government.

Again we can distinguish the lump-sum from the proportional transfer, and that based on income from that based on wealth, and these, in turn, from that based on some item or items of expenditure. We shall also enquire into the influences exerted by any conditions that may be attached to such transfers.

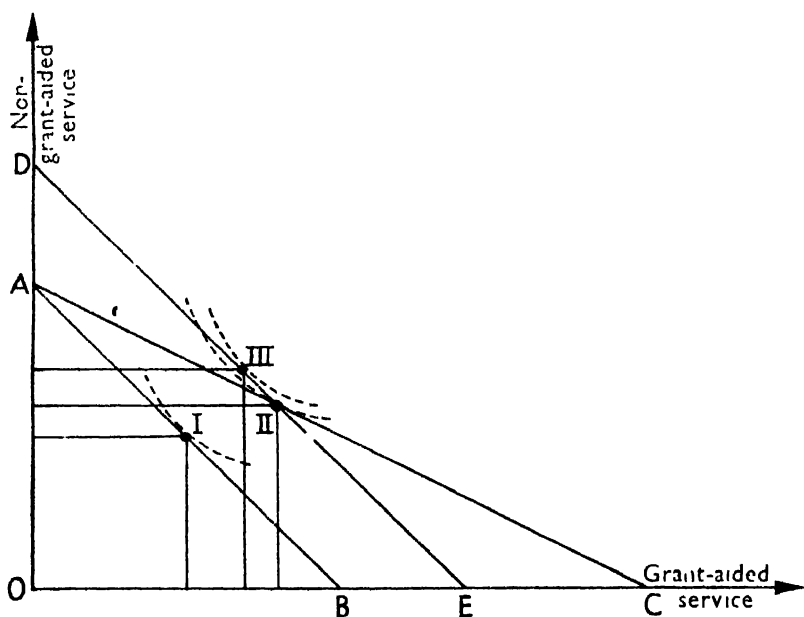


Figure 10.11

## (i) UNCONDITIONAL GRANTS

In the simplest case the receiving government is assumed to perform only two services, one of which is grant-aided by the central government, and the other not, and the grant itself is assumed to be a simple one varying in proportion to the number of units of the grant-aided service that is provided by the receiving government. It is also assumed that the receiving government does not take account of the effects of its grant receipts upon the general financial situation of the grant-giving government, and, in particular, that it ignores any possible consequential variations in central government taxation of the receiving government's citizens. Thus, in figure 10 11,  $4B$  is the possibility line indicating the amounts of the respective services that could be provided out of locally raised resources (these being assumed constant for the moment).  $4C$  then indicates how these possibilities are increased by the provision of a simple proportional grant of the sort under consideration. The chosen combination of services shifts, as a result of the grant, from  $I$  to  $II$  say, which illustrates a case where the provision of both services is stepped up as a result of the grant, even though the grant itself is payable only in respect of one of the services. The reason for this is, of course, that such a grant has both an 'income' effect and a 'substitution' effect, just as

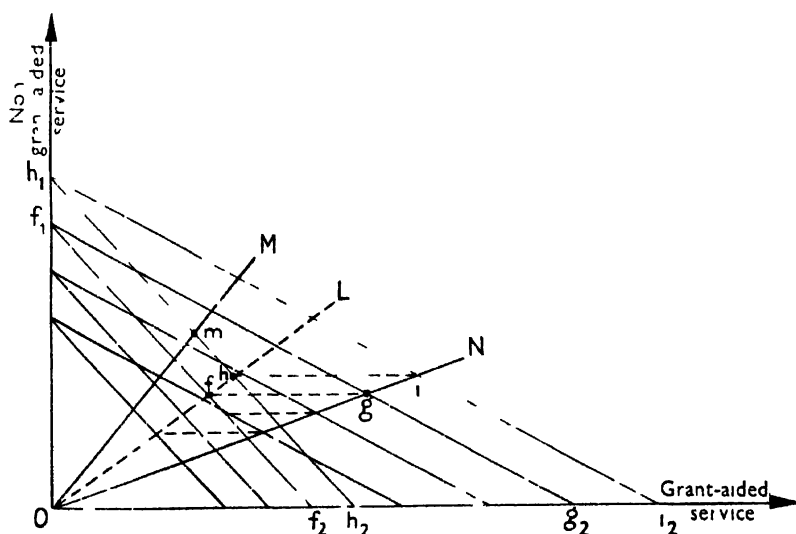


Figure 10 12

with non-lump-sum taxes. Now if a lump-sum grant were substituted, equal in amount to the grant paid out in the preceding case, then it will be seen from figure 10.11 that the receiving government would in fact be better off (since its possibility line would be  $DE$ , through II, enabling it to get to III, which is better than II).

All this assumes that the amounts found out of local resources remain unchanged after the grant is made, i.e. that  $AB$  is constant. Usually the receiving government will be able to vary the amounts it raises from its own citizens, however, and the availability of the grant-in-aid, and its exact nature, may well affect its decisions in this respect. Thus in figure 10.12 is represented a whole 'family' of possibility lines such as  $AB$  in figure 10.11 (marked  $f_1f_2$ ,  $h_1h_2$ , in figure 10.12 and including all lines parallel to them). Similarly, the lines  $f_1g_2$  and  $h_1i_2$  (and all lines parallel to them) in figure 10.12 constitute a 'family' of possibility lines such as  $AC$  in figure 10.11. For simplicity's sake it is assumed that the preferences of the receiving government are such that at all levels of operation it maintains a rigid balance between the two services, but precisely where this balance is struck depends on the rate of the grant per unit of the service provided (but clearly not on its overall amount).•Thus in figure 10.12, the points chosen at each level of operation in the ab-

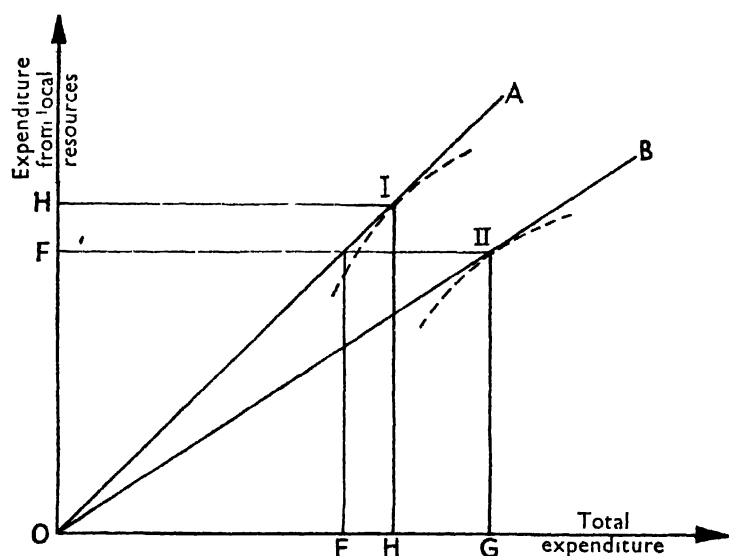


Figure 10.13

sence of any grant (i.e. on the family of possibility lines  $f_1f_2$ , etc.) will all lie on the line  $OM$ , while those chosen when the grant is available (i.e. on the family of possibility lines  $f_1g_2$ , etc.) will all lie along  $ON$ . For any point (such as  $g$  or  $i$ ) on  $ON$  there will be a corresponding point (such as  $f$  or  $h$  respectively) on  $OL$  such that the horizontal distances ( $fg$  and  $hi$  respectively) represent the amount of grant received at that level of operation, i.e. the extent to which the respective amounts of local resources are being supplemented.

If we now turn to figure 10.13, the relationship is shown between varying levels of total expenditure on the two services and the respective amounts to be raised from local resources. With no grants, clearly the level of total expenditure and the amount raised from local resources will be the same for each level of operation, so that a  $45^\circ$  line through the origin (such as  $OA$ ) represents the possibilities confronting the Government, and it is assumed that in this situation it will choose to operate at the level  $OII$  (the point  $I$  on  $OA$  corresponding to the point  $m$  on  $OM$  in figure 10.12). To discover what the relevant possibility line is when the grant is available, we need to turn back to figure 10.12. For any chosen point on  $ON$  (such as  $g$  or  $i$ ) representing a particular level of total expenditure, there is a corresponding point on  $OL$  (such as  $f$  or  $h$ ) representing the part of this that has to be met out of local resources. Thus, given the exact form of the grant and the preferences of the receiving government, we can construct a line such as  $OB$  in figure 10.13, such that if  $OF$  represents a certain amount of local resources (say that represented by  $f_1f_2$  in figure 10.12) then  $OG$  represents the total level of expenditure associated with that commitment of local resources (derived from the point  $g$  on  $f_1g_2$  in figure 10.12). All that is then required is to determine which point on  $OB$  is chosen by the receiving government, i.e. it must decide at what level to operate taking into account the expectation of grant-receipt with the pattern of services it has selected at each level of operation. In figure 10.13 the preferred position on  $OB$  is assumed to be the point  $II$  (i.e. the point  $g$  in figure 10.12), which implies that the provision of a grant will not only swing the pattern of services in favour of the grant-aided service (from  $m$  on  $OM$  to  $g$  on  $ON$  in figure 10.12), but also reduce (from  $OH$  to  $OF$  in figure 10.13) the overall amount of the services met from local resources (in terms of figure 10.12  $f$  is on  $f_1f_2$  which is less than  $h_1h_2$  on which  $m$  lies), in spite of the fact that total expenditure has risen (from  $OII$  to  $OG$  in figure 10.13).

If a lump-sum grant were given instead, but also amounting to  $FG$ , the possibility line would be shifted from  $OB$  to  $CD$  in figure

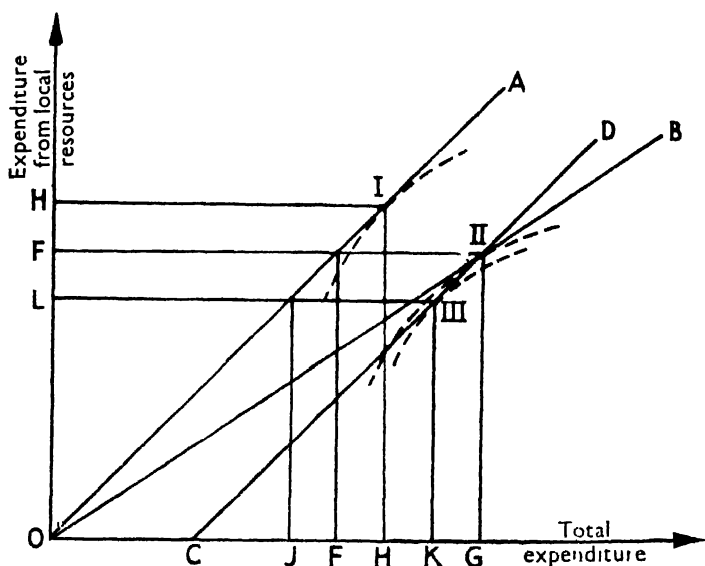


Figure 10.14

10.14 (where  $OC = FG$ ). On this the chosen point III implies a reduction in total expenditure (from  $OG$  to  $OK$ ) as well as a reduction in expenditure on the grant aided service in comparison with that under the other grant, and a consequent reduction also in the call made on local resources (from  $OF$  to  $OL$ ). It will therefore be obvious that the receiving government will prefer a lump-sum grant to an equal sum paid in the form of a proportional grant to aid one service (or part of its services) only.

Similar analyses to the foregoing could be conducted for more complicated forms of grant, e.g. where the central government insists on a certain minimum commitment of local resources before it will offer any subvention, or where the amount of subvention is subject to some upper limit, and so on. These variations only make the details of the analysis more complicated, the general method of analysis remains the same.

## (ii) CONDITIONAL GRANTS

It is quite common to attach conditions to transfers made to other governments. In a sense, limiting the grant to one service only, as in the cases analysed above, makes it a conditional grant, the con-



dition being that the money must be spent on the grant-aided service and nothing else. But the sort of condition that is usually associated with so called 'conditional' grants means more than this. It may mean detailed control over the actual spending of the grant money, or stipulations about the kind or amount of service to be provided, and even control over the spending of local resources devoted to that service or similar services. For example, if a grant is made to help with some social security programme it may well be made conditional upon the rates of benefit and contribution being brought into conformity with some set standards, and upon the administration of the programme being modelled on some prescribed structure even though the administrative costs are not entirely out of local resources.

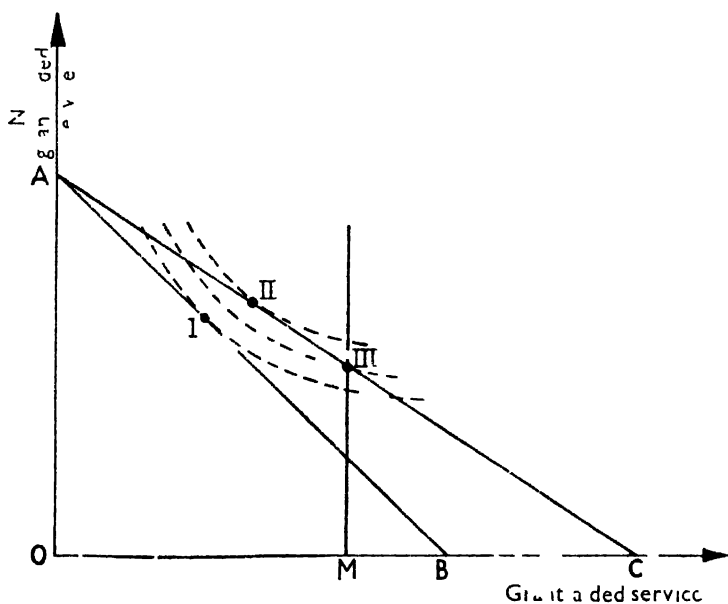


Figure 10 15

It may be of interest to indicate how the analytical tools outlined earlier can help to illuminate the effects of this kind of grant. Let us suppose that a simple proportional grant is offered to help pay for one particular service, on condition that certain minimum standards of performance are met. In figures 10.15 and 10.16 the level of

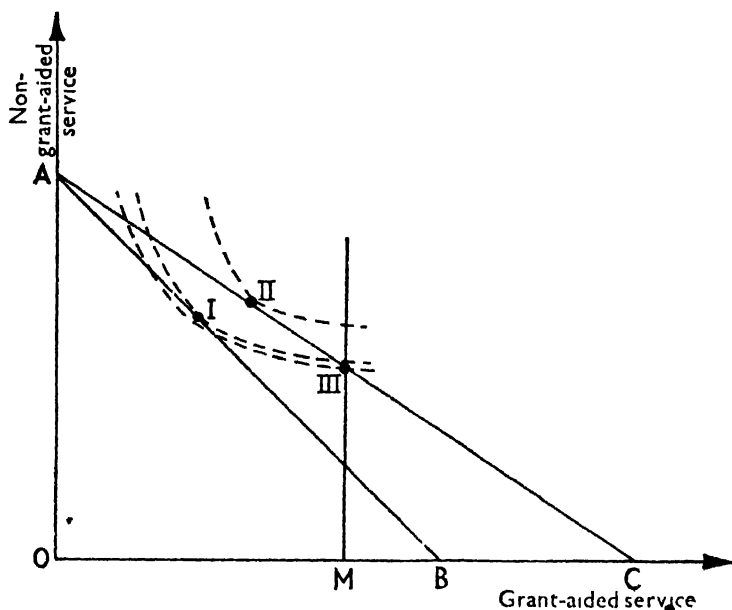


Figure 10.16

operation of the grant-aided service necessary to meet this requirement is assumed to be  $OM$ . The grant-receiving government starts with the possibility line  $AB$  on which it has chosen the position I, and, for the sake of simplicity, possible effects of any grant on the degree to which local resources are employed will be ignored in what follows here. If a simple proportional grant is now given (subject to the minimum standard condition), this shifts the possibility line to  $AC$ , on which the receiving government would (we assume) have chosen the point II had it been free to do so. But the condition imposed precludes the choice of this point and requires that the chosen point lie on or to the right of the perpendicular from  $M$  (the case where II itself satisfies this condition is not analysed here, for in such a situation the condition does not really become effective since it is met by the preferences of the receiving government anyway). Two distinct outcomes are then possible, as shown in figures 10.15 and 10.16. In the former, the freely chosen position II is better than the best position III that can be attained satisfying the conditions of the grant, but this in turn is better than the chosen position I in the absence of any grant. In figure 10.16, on the other

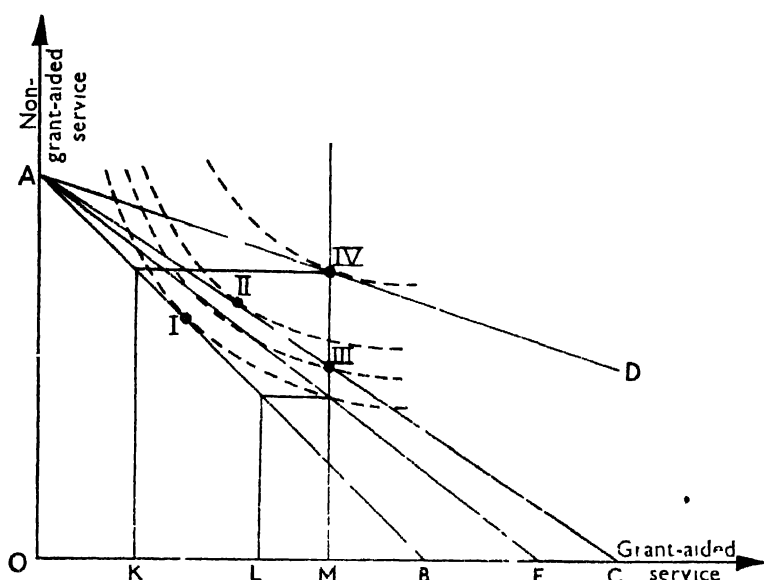


Figure 10.17

hand, the position III is not only inferior to the position II but also to the position I! Thus in the former case the grant will be accepted, while in the latter case it will not . . . you may lead a horse to the water, but you cannot make him drink!

In figure 10.17 an interesting side effect of this situation is explored a little further. Consider once more the receiving government depicted in figure 10.15, and it will be seen that if the rate of grant were increased (i.e. if the possibility line  $AC$  were swung on the pivotal point  $A$  so as to make  $AC$  more nearly horizontal) but the condition of a minimum level of provision of  $OM$  still imposed unchanged, then at first there would be no extra provision of the grant-aided service. Instead, the increased grant-receipts (although 'earmarked' for the service in question) would be used to set free local resources previously committed reluctantly to that service, which would then be devoted to increasing the provision of the non-grant-aided service. Not until the rate of grant had increased sufficiently to make  $AD$  in figure 10.17 the possibility line would there be any increased provision of the grant-aided service, for it is only at this rate of grant that

*OM* of the grant-aided service becomes the level of operation freely chosen (at IV) by the receiving government.

It will also be seen from figure 10.17, that if the grant-giving government wished to induce an expenditure on the grant-aided service of at least *OM*, it is much more expensive to do so, in terms of grant disbursements, by an unconditional grant than by a conditional one (the former involves the equivalent of *KM* in grant aid, the latter not less than *LM*). On the other hand, the receiving government is better off in the former case than in the latter. Herein lies part of the problem of intergovernmental transfers . . . the other part being to decide whose preferences should count in the last resort, but fortunately this lies outside our terms of reference!

### (iii) DISCRIMINATING GRANTS

Both conditional and unconditional grants may be used in a discriminatory way by the granting government so as to help the poorer recipient governments more than the richer ones. Such discrimination may be accidental and capricious in its impact, but more often than not it is deliberate and systematic. Thus, if a grant is given to assist in the provision of primary education, it may be paid according to a formula which embodies a (large) fixed sum per schoolchild plus a (small) percentage of locally financed expenditure on that service. Such a grant does not appear, on the surface, at all discriminatory, and such discrimination as there is might be thought to arise from the percentage element, which would help rich authorities (who can afford to spend more) relatively to poor ones. But with the percentage element small, and the lump-sum per schoolchild large, the latter element will predominate, and, unless the number of schoolchildren happens to vary directly with the wealth of the receiving government, it will constitute a larger proportion of the poorer authorities' expenditure on such education than of that of the richer ones. But grants may be more explicitly discriminatory than this. For instance, the richer governments may be made expressly ineligible to receive a particular grant. Alternatively, a negative element may be included in the grant formula based on some index of the wealth of the receiving governments, which has the effect of making the size of the grant vary inversely with the wealth of the recipient (other things being equal). These various discriminatory elements make the calculation of the grant more complex in any individual case, but the same type of analysis can be applied to discover its impact upon the receiving government as has been applied in the preceding cases.

### (D) PURCHASES OF GOODS AND FACTORS

So far in this chapter we have considered only various forms of transfer payment, and in conclusion we must turn briefly to consider direct purchases of goods and factors by the government from the private sector of the economy. In general such purchases do not require detailed analysis here, since in their impact upon suppliers they are usually similar to comparable purchases by private firms, etc. and can be handled by the application of the well-known tools of economic analysis designed for this purpose.

One possible exception is the case where the Government is the sole purchaser of the good or factor in question (the case of 'monopsony'). It is conceivable that a non-governmental purchaser may also be in such a situation, of course, but it is more likely that a government will be, both because of its rather specialized functions and also due to its unique legal position. Common examples are the purchase of heavy armaments in the case of goods, or of certain kinds of skill (e.g. teachers where education is a State monopoly) in the case of factors. This may enable the Government to discriminate between sellers in a way that would not be possible in normal market conditions. However, these powers will normally be circumscribed by social and political considerations, and in general it will be assumed that the Government enters the market and competes with other buyers for the goods and factors it requires. This would obviously conform more closely to the conditions of the situation in which the Government, though the sole purchaser (of heavy armaments or teachers' services) has still to offer terms attractive enough to ensure that adequate supplies are forthcoming. Other exceptional cases, such as the conscription of labour and the requisitioning of goods, although undoubtedly important in certain situations, will not be dealt with here either, since they usually assume major importance only in times of war or other emergency.

## CHAPTER ELEVEN

### Budgetary Incidence

Up to now the immediate impact of taxes and of transfers upon the behaviour of individuals has been dealt with piecemeal. In this chapter some of these pieces will be put together so as to illustrate how the impact of the whole budget upon a given individual could be analysed in terms of the kind of micro-economic analysis we have been conducting. This will lead on to a brief discussion of some of the broader implications of this incidence analysis, before we turn, in Part B of this book, to a macro-economic analysis which both builds on these results and complements them.

#### (A) COMBINED TAX AND TRANSFER MEASURES

It would take up an inordinate amount of space to explore all the various combinations of taxes and transfers that have been outlined earlier, and the result would be tedious in any case. All that will be attempted here is an analysis of one or two simple situations, which will suffice to indicate how other more complicated cases could be handled.

In the simplest case, all indirect effects will be ignored, and it will be assumed that the income effect of the 'budget' is 'neutral' in its impact upon the individual in question, i.e. the amount he pays in taxes is exactly the same as the amount he receives in transfers. Let us suppose that a simple proportional tax is imposed on income, and a simple proportional subsidy paid on all purchases of food by this individual.

To begin with, we will ignore all effects upon the supply of effort, and concentrate upon the pattern of spending. Thus, in figure 11.1, the initial position of the individual is shown at the point *I*, which is the preferred combination of food and clothing from those available to him along his possibility line *AB*. The simple proportional income tax is equivalent to a lump-sum tax in this context, and will therefore shift his possibility line to some such position as *CD*. The simple proportional subsidy on food must then be such that the chosen point

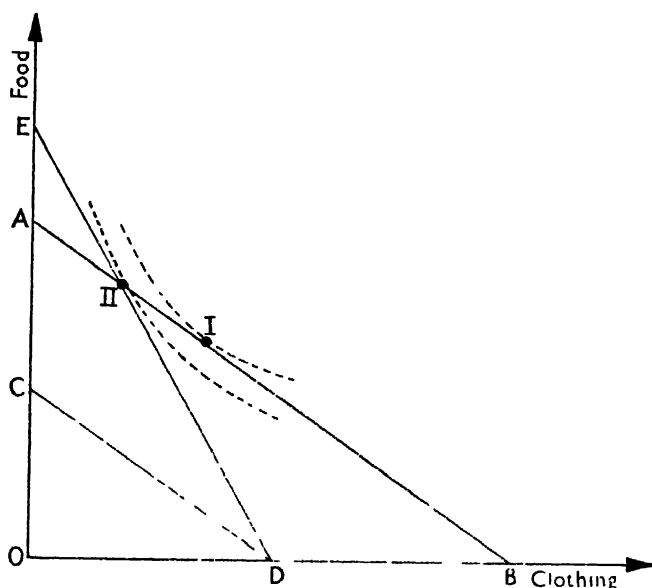


Figure 11.1

on the resulting possibility line (from  $D$ ) lies somewhere on  $AB$  (otherwise the 'income effect' will not be neutral). Such a possibility line is indicated in figure 11.1 by  $DE$ , on which the chosen point is  $II$ . Here the individual buys more food and less clothing than he did originally, and considers himself worse off than he was before (since the indifference curve tangential to  $DE$  at  $II$  is lower than that tangential to  $AB$  at  $I$ , or, in less technical jargon, since the position  $II$  was available to him when he chose  $I$ , but  $I$  was not available when he chose  $II$ ,  $I$  must be preferred to  $II$ ).

When the possibility is introduced of variations in the amount of work done (or of leisure taken) then the situation becomes more complex, but the main conclusions remain unchanged. In figure 11.2 leisure is introduced on the third axis (compare figure 9.6 above), with  $x_1z$  as the initial possibility plane,  $abz$  the possibility plane with the imposition of the simple proportional income tax, and  $aez$  the possibility plane when the simple proportional subsidy is granted on food. If the individual's initial position had been  $I$  one possible post-tax-and-post-subsidy position that he might choose is the position  $II$  (the cross-section drawn through  $I$  and  $II$  corresponding precisely to figure 11.1). This choice would imply no change

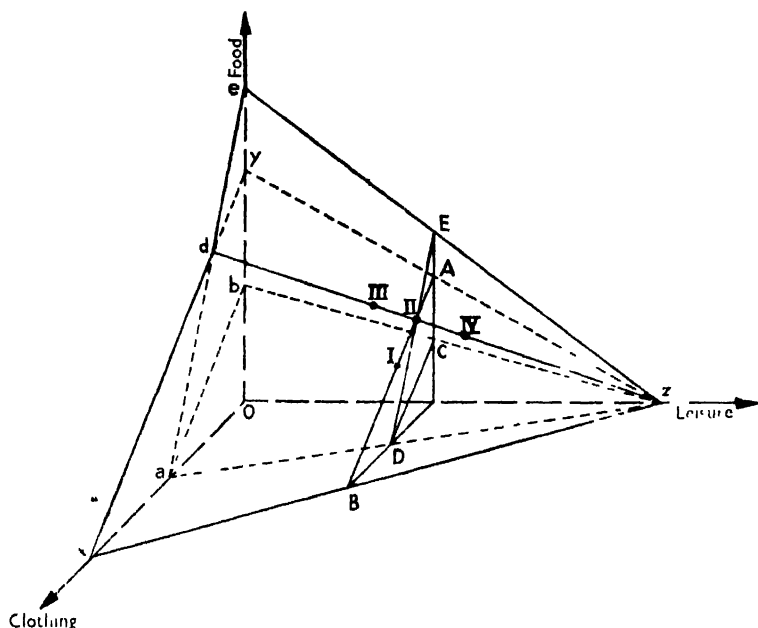


Figure 11.2

in leisure, of course. But II is on the line  $dz$ , which is the locus of all points common to the original possibility plane  $xyz$  and the post-tax-and-post-subsidy possibility plane  $aez$ , and all points on this line satisfy the condition that the income effects of the two measures together are neutral. Consequently, the individual might also have chosen points such as III or IV, in the former case sacrificing some leisure and getting more food than in the initial situation, while in the latter case (of point IV) taking more leisure and less clothing than originally. But whichever is the outcome, it will always be true that the individual will be worse off than he was at I, because all the possible outcomes on  $dz$  were available to him when I was chosen, so I must be preferred to them.

The introduction of further complicating elements will change the outcomes again, of course, and other combinations of taxes and transfers could similarly be investigated, but the general welfare conclusion remains unaffected throughout. Since the individual's initially chosen position is always denied to him after the introduction of the tax and subsidy, and since the point subsequently chosen under the tax and subsidy was available when the other initial



point was chosen, then clearly he is always going to be worse off than he was originally. However, it should be added that this is not in itself sufficient to condemn such measures without further consideration, for, in the first place, this is a result of the special assumptions about neutralized income effects, and, in the second place, the Government may deliberately use such measures to lead individuals to make choices which the Government wants them to make (e.g. to buy more food and less clothing) and which the individual would not make of his own accord without the tax and subsidy.

### (B) REDISTRIBUTIVE EFFECTS AND INCIDENCE

If we relax the condition that the amount of tax payable is to be the same as the amount of subsidy receivable, and allow a 'net redistributive effect' to arise, then our earlier conclusions will of course be radically modified. But since there are so many variations on this theme to be considered, there seems little point in going through them here, for they can be analysed quite simply by an obvious extension of the preceding analysis. A few words will, however, be devoted to some of the more general implications of the analysis as conducted so far, as it bears upon such popular topics as income redistribution through the budget, and the incidence of taxes and transfers.

Most of the analysis of taxes and transfers has been conducted on the assumption of some given amount of tax or subsidy, comparisons being made between different tax or subsidy structures satisfying this condition. There was no question of such taxes or transfers being used to effect a redistribution of purchasing power between individuals. This is of course, most unrealistic, since a great deal of the argument about budgetary policy centres upon this very point. Nevertheless, although the analytical frameworks within which we have worked hitherto have been carefully designed to exclude this aspect of the problem, this does not mean that the conclusions reached so far are worthless, and still less does it mean that the analytical framework itself is useless. In the first place, the discriminatory effects of the various tax and subsidy structures, which are brought out so clearly in the kind of analysis we have conducted, still remain when the equal-yield condition is relaxed, although they may be obscured by the redistributive effects. But perhaps more important, the same kind of analysis can be applied to the situation where the equal-yield condition is dropped, and it is often easier

than the equal-yield analysis, because there are not so many restrictions to work within simultaneously. Some simple applications of the earlier analysis to this new situation will be outlined briefly in the following paragraphs.

One important conclusion of the earlier analysis that is particularly relevant here is that the effects of a tax or transfer upon the welfare of an individual are very inadequately indicated by the amount of tax he pays or the amount of subsidy he receives. Numerous cases have

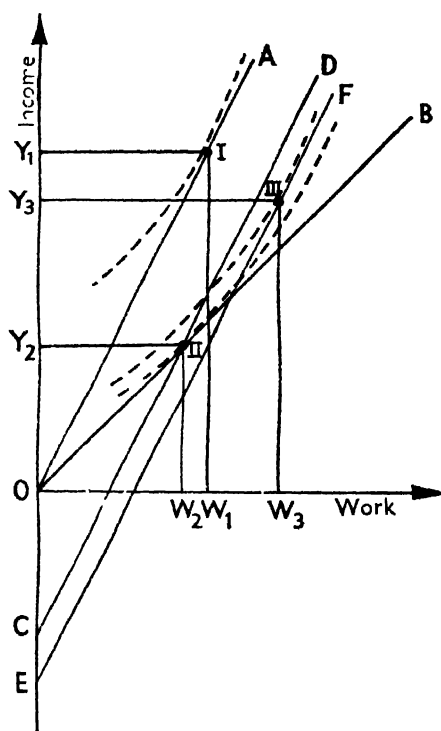


Figure 11.3

already been examined where the payment of tax by some individual was the same under two separate taxes, yet the effects on his welfare were very different. The same may hold as between individuals, as will be seen from the example set out in figure 11.3 and 11.4. Here are depicted the situations confronting two individuals in their decisions as to how much work they will do (compare figures 3.5

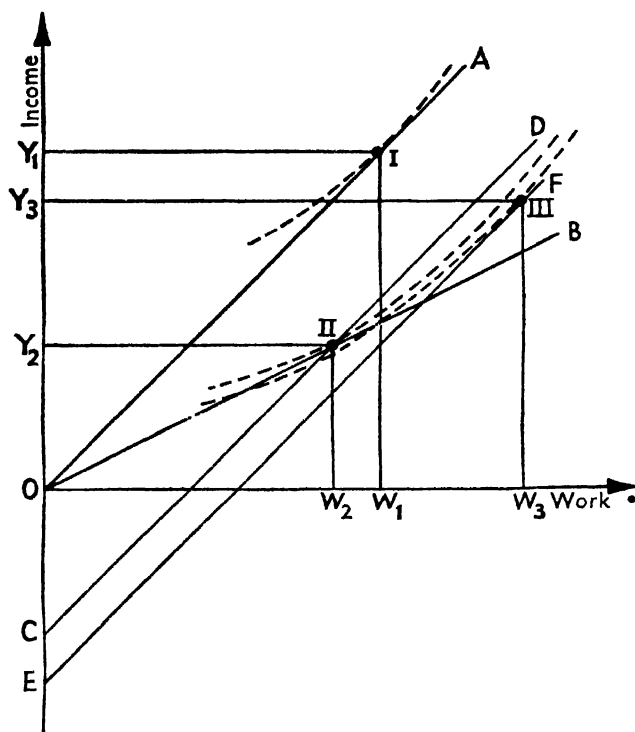


Figure 11.4

and 3.6 above). The 'observable' elements in each individual's situation have been made the same. Thus both earned the same income before tax ( $OY_1$ ), the same simple proportional income tax was imposed on both, shifting them to a post-tax position in which both work less than before and both earn the same net income ( $OY_2$ ). If a lump-sum tax were substituted for the simple proportional income tax, so as to increase the tax yield from each individual from  $OC$  to  $OE$ , the new possibility line would be  $EF$  in each case. Let us assume that in this new situation both individuals decide to work more than they did in the no-tax situation, and that they finish up with the same post-tax income as each other again ( $OY_3$ ). Assessed in terms of tax payments and size of income in each situation, the two cases are identical. Moreover, we would be tempted to say that since both individuals work harder and pay more tax under the lump-sum than under the income tax, they are worse off in the former case than in

the latter. Yet scrutiny of figures 11.3 and 11.4 will show that the cases are not identical. The first individual can earn income for less effort than the second can and they have different preferences with respect to work and income. Thus although the second individual (see figure 11.4) is, as we expected, worse off under the lump-sum than under the income tax, the first individual (in figure 11.3) is actually better off!

In the example just quoted, the reactions of both individuals were such as to keep their incomes and tax payments the same in each of the situations confronting them. But it is easy to show that even where this is not so one can still be led into misleading conclusions if one takes the immediately obvious redistributive effect as an indicator of the direction of change in that individual's welfare. Thus, to revert to the tax and subsidy case analysed at the beginning of this chapter, we saw in figure 11.1 that even when the net redistributive effect of the tax and subsidy was nil, the individual was in fact worse off. This can be carried further. In figure 11.5 is depicted a case where, although the amount received by way of subsidy is greater than the amount paid in tax (since the point II lies outside the original

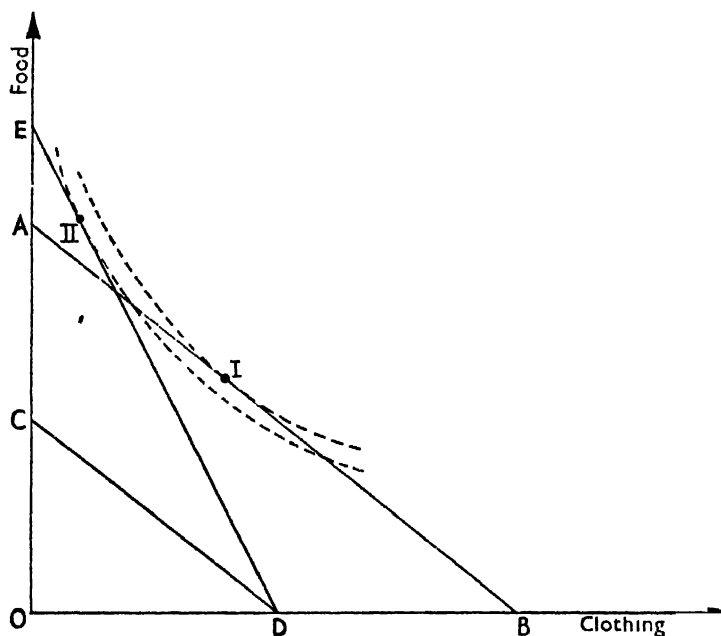


Figure 11.5

possibility line *AB*), the individual is nevertheless worse off than he was originally.

However, the redistributive effects do not end there, as will be shown in more detail in the following chapter, for so far we have only been concerned with the 'formal incidence' or immediate impact of these various measures. Once the further repercussions of these various changes in behaviour are taken into account, the relationship between the apparent redistributive effects and the real incidence of these measures becomes even more tenuous and potentially still more misleading.



## PART B

### Macro-economics

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Having examined in some detail the impact of various taxes and transfers upon the behaviour of individuals and firms, we now need to focus our attention upon a different aspect of the problem. Instead of asking how an individual may react to a given tax, we shall instead ask how a given reaction pattern will affect the economy generally. What we are doing, therefore, is to consider the repercussions of a particular reaction pattern, to see how it will affect the environment in which individual decisions are made. Although the reaction of any one individual is normally insignificant in its effects on the economy as a whole, when large numbers of people react in the same way to a given tax change, the economy is likely to be affected quite perceptibly, as we shall see. This change from consideration of the individual, to consideration of the effects of the behaviour of large numbers of individuals upon the economy as a whole, is the transition from micro-analysis to macro-analysis.

Before embarking upon the detailed analysis, a fairly simple example may be useful to make this distinction quite clear. In considering the effects of various taxes upon the supply of effort, we found that for some individuals the reaction pattern was of one kind for others of a different kind, and we concluded that *a priori* one could not say definitely that any particular tax would act as an incentive or as a disincentive compared with the no-tax situation. Empirical investigations might show, however, that in some particular situation the incentive effects had outweighed the disincentive effects, so that we would be prepared to assume that if such a tax were imposed in that situation, the general reaction would be a slight increase in the amount of work done. This result then forms the basis for a macro-analysis of the effects of a slight increase in the supply of effort upon the economy as a whole. It might lead to a slight fall in the general level of wage-rates because of the increased supply, or this effect might be offset by an increased demand for labour on account of the extra demand for goods generated by the spending of the tax revenue by the Government (assuming that the curtailment of private spending due to the tax is less than the in-

crease in public spending resulting from it). The extra supply of effort makes possible a larger supply of goods, however, and this too would have to be taken into account, as will certain structural changes due to the fact that the increased supply of labour may be different in kind from that demanded, and similarly with the demand and supply of goods. These changes will probably affect a wider range of individuals than those whose tax reactions we were originally considering, so that we then need to go back to the micro-analysis to see what individuals will do in this new environment. Their reactions must then be fed back into the macro-analysis again, and so on.

In principle this process could go on for a long time, in practice it is likely to be cut short at an early stage for lack of information. Usually economic analysts cut it short anyway by the exercise of judgment, good or bad, which involves assuming that certain reactions, though possible (and perhaps even certain), are not important enough, with respect to the issue under discussion, to merit further consideration. For instance, the slight increase in the supply of effort which was assumed to follow from a certain tax in a certain situation, might well be disregarded if what was under consideration was the effect of that tax upon the balance of payments. From this viewpoint, it might be much more important that the tax was levied on some good or goods which were sold on the home market and for which there was an unsatisfied export demand. Or it might be much more important to know what *kinds* of effort were reduced, and which increased, by the tax, the *overall* effect being a secondary consideration to the structural changes.

The exercise of judgment can be learned, but not, it seems, taught, and it is certainly no part of my present purpose to issue *obiter dicta* on that aspect of economic analysis. It is rather my purpose to expound a framework of analysis within which such judgment can be exercised. This analytical framework cannot be as comprehensive as I would like, for that would obscure the main issues, so that an element of judgment is already present in the selection of material. However, most of the considerations that I have excluded can be built into the analysis that follows, and wherever I am conscious of important limitations, I have tried to point them out.

The kind of framework that is needed is one which can take account of broad shifts in factor supplies, in relative prices and incomes, in output, and so on. No explicit reference need be made to individuals or firms, since their reactions can be assumed on the basis of the micro-analysis, alternative assumptions being explored if necessary. Obviously, it will be impossible to deal with more than a very small



sample of the wealth of cases that could conceivably be investigated. Those treated explicitly in the following chapters have been selected partly because they are fairly typical, and partly because they provide plenty of scope for showing how the analysis is to be conducted. The prime purpose of the conceptual framework is not to prove any particular point, but to show how macro-economic problems can be thought through with a fair amount of rigour and clarity, indicating the major considerations that are to be borne in mind.

In the following chapters various budgetary measures will be examined in relationship to three important fields of economic policy. These broad policy fields cover the structure of the economy, its stability, and its growth. Each of these will be taken up in turn, while the other two are temporarily ignored. Their inter-relationships and several more general considerations, will be taken up in the concluding chapter of this book.

## CHAPTER TWELVE

### The Structure of the Economy

By 'the structure of the economy' is meant the *pattern* of production, the *pattern* of demand, the *distribution* of incomes, and so on. In order to analyse this kind of repercussion, we need a model of the economy in which there are at least two goods, two consumers, and two kinds of factors, and one which takes account of the relationships between them. Such a model is outlined in this chapter, and used to analyse the effects on the structure of the economy of some typical examples of budgetary intervention.

#### (A) THE BASIC MODEL

##### (i) SUPPLY CONDITIONS

It will be assumed that there are only two factors of production, labour and capital, and only two products, food and clothing. Food production requires relatively more labour in relation to capital per unit of output than does the production of clothing. Labour and capital move freely between the two industries, techniques of production are fixed, and there are constant returns to scale. There is no foreign trade. Initially, we assumed also that the amounts of the two factors are fixed, so that the maximum amounts of food and clothing that can be produced, assuming the most efficient use of the available factors, can be set out on a production possibility curve (or transformation curve) as shown by  $TT'$  on figure 12.1. This shows that if all the available factors were allocated to the production of food, the resulting output would be  $OT$  of food, and no clothing. Conversely, if all resources were concentrated on clothing production, there would be  $OT'$  of clothing but no food. The intermediate possibilities are indicated by the curve between  $T$  and  $T'$ , and among these is the combination  $Q_1$  ( $OC_1$  of clothing and  $OF_1$  of food) and the combination  $Q_2$  ( $OC_2$  of clothing and  $OF_2$  of food).

In order to determine which of the various possible combinations of food and clothing will in fact be produced, we must look at the

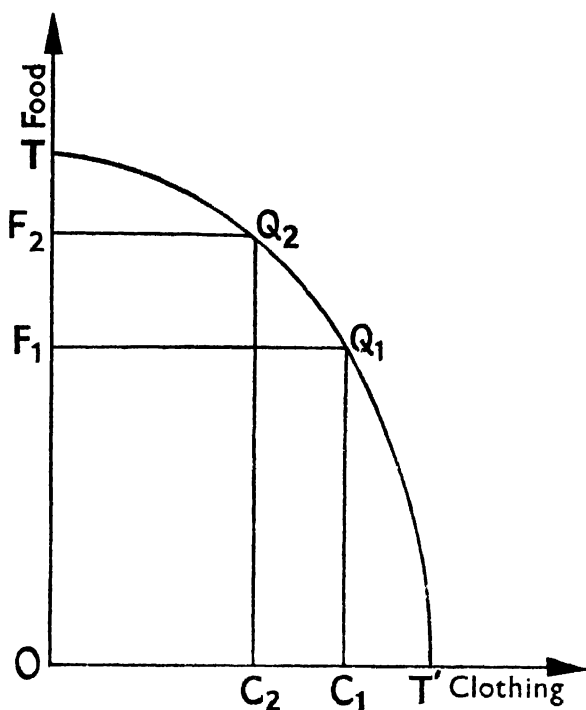


Figure 12.1

decisions of producers, and how they are made. Here the usual simplifying assumptions will be made about the markets being competitive, there being no problems concerning foresight, and all adjustments of output being made smoothly. In the simplest terms, this means that producers will so arrange output that marginal cost equals marginal revenue (or price). In terms of figure 12.2 this means that output adjustments will occur until the point is reached on the transformation curve where the price line ( $P_1P_1$ ) is tangential to it, which is at the point  $Q_1$ . Here the marginal rate of transformation of food into clothing (i.e. the slope of the transformation curve  $TT'$ ) is equal to the rate of exchange of food for clothing in the open market (as shown by the price line). The higher the price of food relatively to clothing, the more nearly horizontal will the price line be, and the nearer to  $T$  on  $TT'$  will be its point of tangency with the transformation curve, hence the more food and the less clothing will be produced, as one would expect.

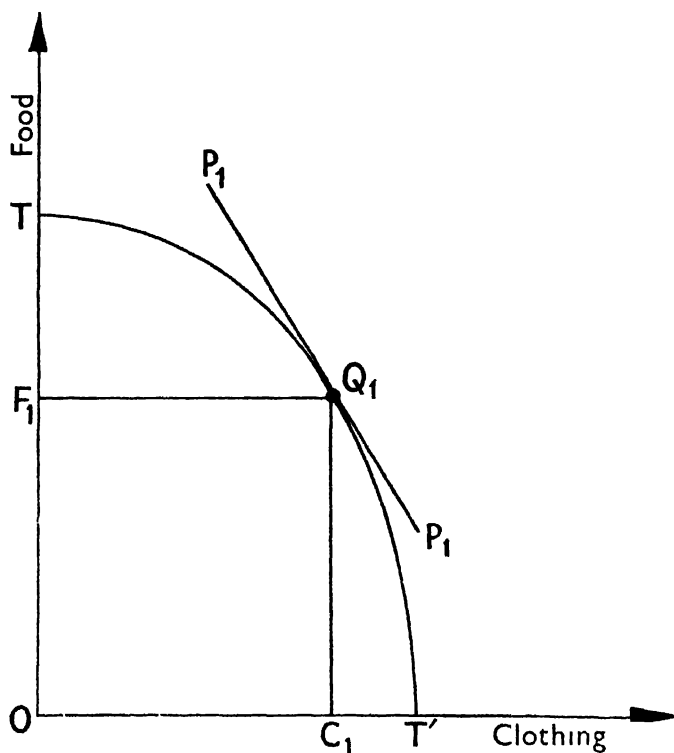


Figure 12.2

## (ii) DEMAND CONDITIONS

But why should the price line be  $P_1P_1$ ? Clearly, prices are determined by both supply and demand, and so far explicit consideration has only been given to the supply conditions. We must next turn to demand. For the moment it will be assumed that all consumers have identical tastes and identical incomes, all of which are spent on food and clothing. Since we have perfect competition, every consumer is confronted by the same circumstances in making his choice, and the foregoing assumptions ensure that each will make the same choice. Each will equate the marginal rate of substitution of food for clothing with their relative prices as given by the price line. With all consumers identical, we can draw up one communal indifference map for them all. Thus in figure 12.3 the indifference curve  $AA$  is for all consumers, and shows that, confronted with the relative

prices generating the price line  $P_1P_1$ , they will choose the point  $Q_1$  on it, and it so happens that this is the output that producers have chosen to produce, so demand will equal supply, and this will be an equilibrium situation. Since producers operate so as to equate the

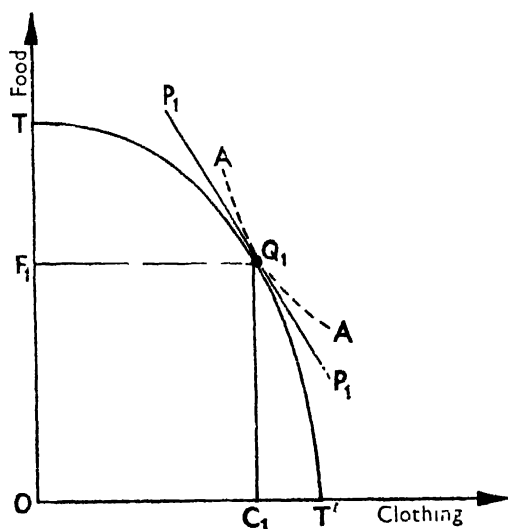


Figure 12.3

marginal rate of transformation with the price line, and consumers so as to equate the marginal rate of substitution with the price line, so long as both are using the same relative prices as their guide, the marginal rate of transformation will in this way be brought into equality with the marginal rate of substitution. Had the indifference curve  $AA$  been tangential to  $P_1P_1$  somewhere above and to the left of  $Q_1$ , then the demand for food would have been greater than the supply ( $OF_1$ ) and the demand for clothing less than the supply ( $OC_1$ ). The price of food would have risen due to the excess demand, the price of clothing have fallen due to excess supply, the price line therefore being swung so as to be more horizontal than before. Consumers and producers would then have to adjust to this new situation, and this process of adjustment would continue until an equilibrium situation, where supply and demand are equal, is established, such as is shown in figure 12.3 as we saw earlier. Alternatively, had the indifference curve  $AA$  been tangential to  $P_1P_1$  below and to the right

of  $Q_1$ , there would have been a similar adjustment process, though in the opposite direction.

(iii) DIRECT VS. INDIRECT TAXES IN THIS MODEL

Two taxes will be introduced into this model: a simple proportional income tax and a simple proportional tax on clothing. The assumption of fixed factor supplies (which will be relaxed later) excludes the possibility of any incentive or disincentive effects. Moreover, it will be assumed during the discussion of the relative impact of these two taxes, that the Government simultaneously uses the tax revenues to make lump-sum transfers to each taxpayer equal to the amount he pays in tax. This assumption will also be relaxed later, and other possibilities explored. For the time being however each individual is in the situation illustrated in figure 12.4. Here  $AB$  is his original possibility line (price line), shifted to  $AC$  by the tax on clothing, and then to  $DE$  by the lump-sum transfer. For the amount of the tax payment and the amount of the transfer receipt to be the same, the chosen point on  $DE$  has to be on  $AB$  (i.e. at the point II). Compare figure 11.1 earlier for the converse case to this. The proportional income tax is, in effect, a lump-sum tax within the framework of

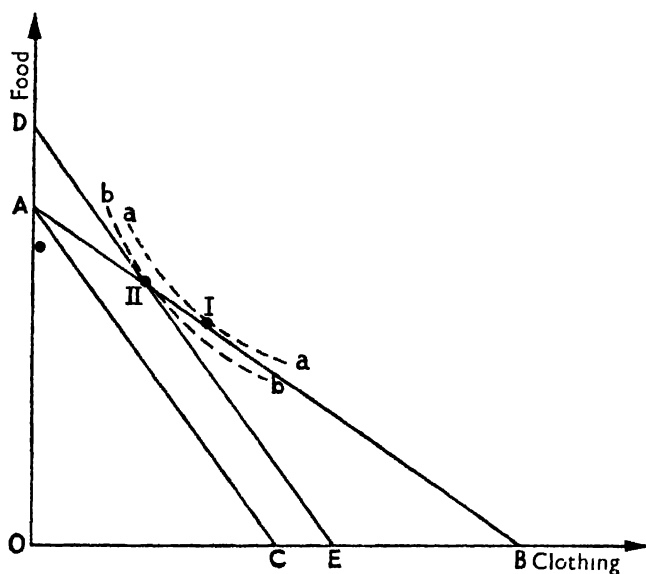


Figure 12.4

assumptions that is being employed here, so that if the proceeds of such a tax are merely to make a lump-sum transfer payment of equal amount, the individual will be precisely where he started, i.e. on  $AB$ , and will hence still choose the point  $I$ . Thus the special significance of indirect taxes relatively to direct taxes in this model, is that the immediate effect of the former is to change the relative prices confronting the consumer, while the latter do not. It is the implications of this that we have now to explore.

In order to carry out a macro-analysis of the effects of an indirect tax, the process of adjustment will be artificially split into distinct stages. In the first stage it will be assumed that producers' decisions about output have already been made and carried out on the basis of the pre-tax situation, but that consumers' decisions are not made until after the imposition of the tax. In the second stage, producers react to the new decisions of consumers, and each successive stage alternates between consumers' further adjustments and producers' further adjustments, until some equilibrium is reached. This new equilibrium position will then be compared with the original one which will also be the position under the income tax, since we have seen that the income tax will not disturb the initial situation under the assumptions we are making.

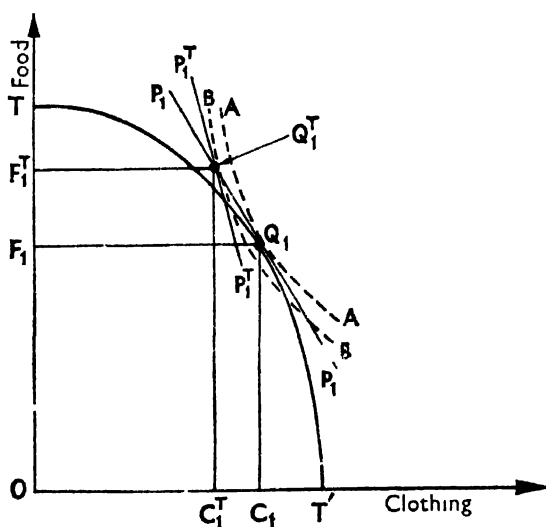


Figure 12.5

In figure 12.5,  $Q_1$  is the amount of food ( $OF_1$ ) and clothing ( $OC_1$ ) that has already been produced in response to the relative prices represented by  $P_1P_1$ . The new (unexpected) tax on clothing shifts the price line facing consumers to  $P_1^TP_1^T$ , and it is on the basis of this set of prices that they have to make their decisions. They will, of course choose the point  $Q_1^T$  where this new price line is tangential to the indifference curve  $BB$ . This means that the consumers' demand for food ( $OF_1^T$ ) will be greater than the amount of food being produced ( $OF_1$ ) and its price will consequently tend to rise, while the demand for clothing ( $OC_1^T$ ) will be less than the amount supplied ( $OC_1$ ) and its (pre-tax) price will consequently tend to fall. The economy could not, in any case, produce the amount  $Q_1^T$  with the resources at its disposal, for  $Q_1^T$  lies outside the production possibility curve  $TT'$ .

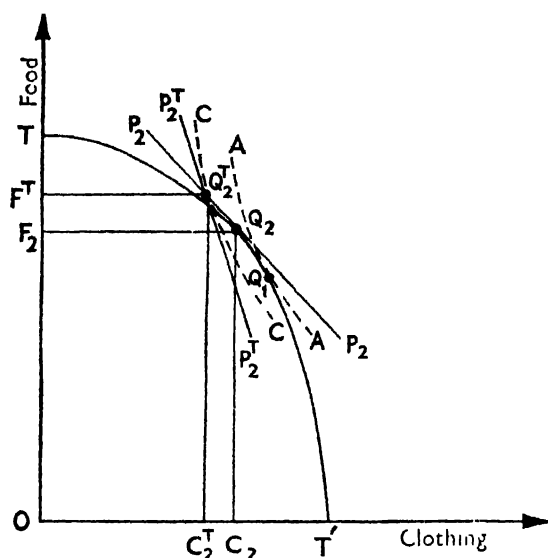


Figure 12.6

In the second stage the pre-tax price line will therefore have shifted so as to become more nearly horizontal, i.e. from  $P_1P_1$  to  $P_2P_2$  in figure 12.6. It is now this price line  $P_2P_2$  (which does not include the tax on clothing) which is relevant for producers' decisions, for they are interested in their *revenues net of tax*, whereas consumers, as we shall see, have to consider their *outlays including tax*. So



production decisions will be such as to lead to the output  $Q_2$ , where  $P_2P_2$  is tangential to  $TT'$ , while consumers will seek to purchase the quantity  $Q_2^T$ , where  $P_2^TP_2^T$  is tangential to the indifference curve  $CC'$ . There will consequently still be a disequilibrium as in the first stage, with an excess demand for food and an excess supply of clothing.

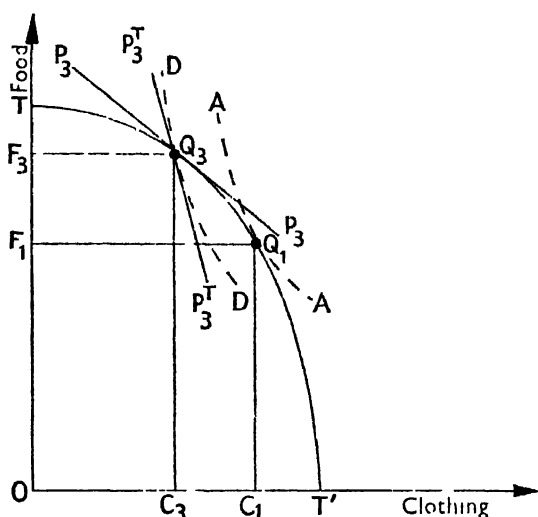


Figure 12.7

These successive adjustments will in fact continue until some such position as that shown in figure 12.7 has been reached. At this stage the relative prices excluding tax have shifted to  $P_3P_3$  so that producers are supplying the output  $Q_3$  (i.e.  $OF$  of food and  $OC_3$  of clothing), while the relative prices including tax are  $P_3^TP_3^T$ , so that consumers have adjusted their demands to the point where this price line is tangential to the indifference curve  $DD$ , which is also at the output  $Q_3$ . Hence supply and demand are once more equal and this is an equilibrium situation.

As seen by a particular individual, this is an essentially similar situation to that depicted in figure 12.4, but the original consumption possibility line  $AB$  will have moved, because of changes in the relative prices of food and clothing excluding tax, to  $A_3B_3$  in figure 12.8. The tax on clothing would then shift his possibilities to  $A_3C_3$ , while the lump-sum transfer will take him to  $D_3E_3$ , on which possibility

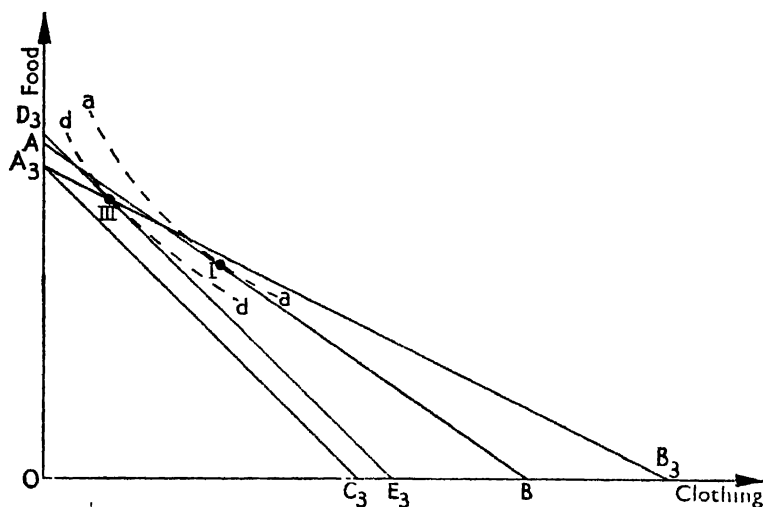


Figure 12.8

line he will choose the point III. If his chosen amount were added to all the similar amounts chosen by all other individuals, we should arrive at the total  $Q_3$  depicted on figure 12.7. The macro-analysis of figures 12.5. to 12.7 thus indicates how the shift in  $AB$  occurs as a result of the choice by each individual of point II instead of point I in figure 12.4 when confronted with the indirect-tax-plus-lump-sum-transfer. The new situation is an equilibrium in the micro-sense because each individual has adjusted himself fully to the new circumstances resulting from the tax-and-transfer measure, and in the macro-sense because the economy is so adjusted that these choices are attainable.

This new equilibrium position differs from the original one in two important respects. Firstly, the indirect tax drives a 'wedge' between the prices confronting producers and the prices confronting consumers. Thus although  $Q_3$  is an optimum position for both groups in the second situation, their respective decisions were based on different price considerations. Secondly, since  $Q_3$  is on a lower indifference curve ( $DD$ ) than  $Q_1$  is ( $AA$ ), then the best position attainable under the indirect tax is inferior to the best position attainable under the direct tax. As with the comparable conclusion under the micro-analysis (see Chapter IX), however, the restrictive assumptions needed to achieve this result must be borne carefully

in mind here. As we relax some of them, we shall again find that this simple conclusion needs to be modified.

#### (iv) VARIABLE FACTOR SUPPLIES

The whole of the analysis so far in this chapter has been based on the assumption that the amounts of labour and capital have been fixed. This means that neither changes in basic factor prices nor the taxes and transfers that have been introduced have been allowed to have any effect upon the supply of these factors. It is now time to relax this assumption to see what effect variability of factor supplies would have upon our conclusions.

For the sake of simplicity, only changes in labour supplies will be considered. Changes in the supply of capital would have comparable effects upon the structure of the economy, but they also raise many additional problems which it is convenient to pass over at this point. Further consideration of this topic will be deferred until later chapters.

As before with the micro-analysis, the easiest way to fit variations in the supply of labour into our analytical framework is to consider leisure to be the third good, co-ordinate with food and clothing, and requiring the sacrifice of the income earned by supplying labour if it is to be obtained, and of the goods that could be produced by that labour if it is to be available. Thus figure 12.9 is a three-variable version of figure 12.1, and in fact incorporates the latter. The curved surface  $CFL$  represents the various combinations of clothing, food and leisure that are available for the economy as a whole. Assuming that the amount of leisure were fixed at  $OL_1$ , then the combinations of food and clothing available would be given by the curve  $TI'$ , which is a line on the surface of  $CFL$ . This is of course the situation analysed earlier in figure 12.1.

Continuing our assumptions about identical tastes and incomes, so that we can sensibly consider community indifference curves, we know that on  $TT'$  the preferred combination of food and clothing was  $Q_1$ . If this is to be the preferred position no matter how much leisure is taken, then there must be no other point on the whole surface of  $CFL$  that is preferred to it. In technical terms, this means that an indifference surface must be just tangential to the surface of  $CFL$  at that point. Let us suppose that this is so. Now the analysis leading up to figure 12.7 showed that, so long as the economy was forced to stay on  $TT'$  (i.e. so long as no change was allowed in the supply of labour . . . or here the amount of leisure taken), the clothing tax would shift the community to the position  $Q_3$ . In figure 12.9, the point  $Q_3$  corresponds to  $Q_3$  in figure 12.7, but instead of being

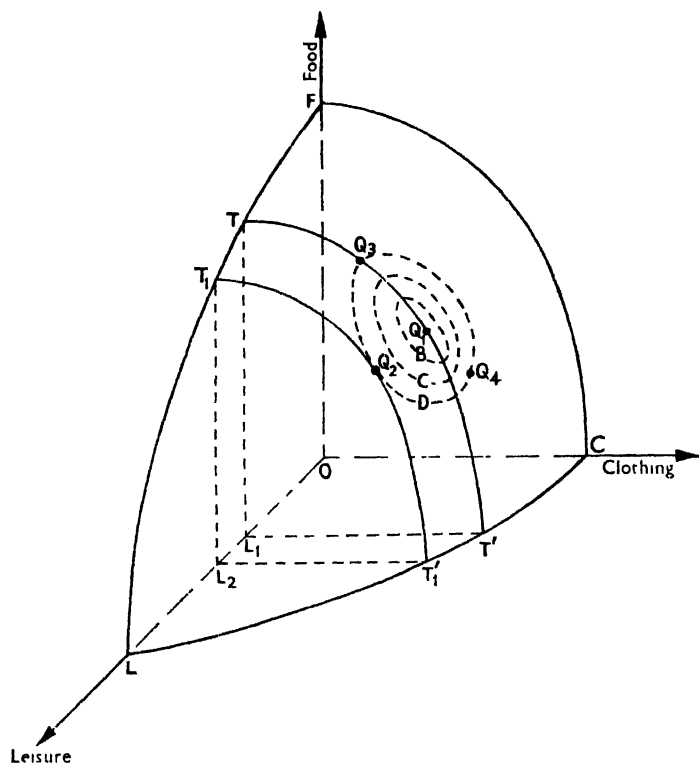


Figure 12.9

on the indifference *curve*  $DD$  (in two dimensions), it is now on the indifference *surface*  $DD$ , the locus of points where this surface cuts through the surface of  $CFL$  being shown by the dotted line  $D$  (which also passes through  $Q_2$  and  $Q_4$ ).

Now what would happen if the income tax, but not the clothing tax, were permitted to have an effect on the supply of effort? If the assumption is maintained that the tax revenue is exactly offset for each individual by a lump-sum transfer, this means that the income effect of the tax is neutralized, and we have only its substitution effect to consider, and this will lead to less effort being supplied, i.e. more leisure being taken. The community will therefore move to some position on  $CFL$  nearer to  $L$  than any of the points on  $TT'$ . One such position would be  $Q_2$  in figure 12.9, and if this were the point chosen it would leave the community just as well (or badly) off as it was at  $Q_3$ , since both are on the same indifference surface. If the

newly chosen point lay inside that part of the surface of *CFL* bounded by the dotted line *D*, then the community would be better off than at  $Q_3$ , and it would be worse off if the newly chosen point lay outside that area.

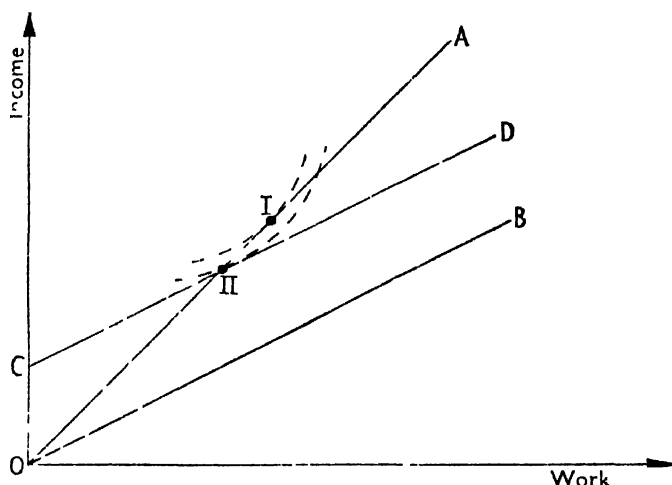


Figure 12.10

A brief excursion into micro-analysis might be useful here to establish comparability with our earlier results. Figure 12.10 shows that the pre-tax possibility line *OA* facing each individual in his choice between income (i.e. food-and-clothing) or work (the obverse of leisure). This is shifted to *OB* by the simple proportional income tax, and then to *CD* by the lump-sum transfer, and on this line the individual will choose the position II, at the intersection of *CD* and his original possibility line *OA*. It will be seen that the point II must involve less work being done than was done originally at the point I, and since this will be true for all individuals we concluded that the amount of leisure taken by the community as a whole must increase.

Earlier we saw that by combining different taxes and subsidies in a variety of ways, a wide range of individual reactions could be produced, so that it would be possible to shift the community in all sorts of complex ways to various parts of the transformation surface *CFL*. It does not require a great deal of further detailed analysis to indicate that a situation (such as  $Q_4$  on figure 12.9) where the amount



now a separate consumption possibility curve  $UU'$  confronting the community as private individuals, which lies a constant distance  $T'U'$  to the left of  $TT'$ , where  $T'U'$  is the amount of clothing that the Government is to 'absorb'. If the community chooses to be at the point  $Q'_2$  on  $UU'$ , this means that production must be at the point  $Q_2$  on  $TT'$  if the Government's demand for clothing is also to be met. The price line will have shifted from  $P_1P_1$  to  $P_2P_2$ , i.e. clothing will have become relatively dearer, output will have shifted from  $Q_1$  to  $Q_2$ , i.e. more clothing and less food will be produced, while private consumption of both commodities will have fallen (from  $Q_1$  to  $Q'_1$ ). The Government could achieve this result by levying an income tax sufficient to shift the consumption possibility line to  $P_2P_2$  through  $Q'_2$ , and by spending the proceeds on clothing.

But other variations on this pattern of adjustment are also possible. If the Government's needs for clothing were temporary (say for stockpiling or in case of some emergency) it might not wish the production shift to occur, since this might involve unnecessary dislocation when things are expected to return to normal shortly afterwards and Government purchases of clothing cease. Could it then obtain this same amount of clothing and still keep the pattern of production at  $Q_1$ ? On figure 12.12 are set out two ways in which this could be done. Once more the economy starts from an equilibrium position at  $Q_1$  on  $TT'$ , with relative prices as indicated by  $AB$  (the whole consumption possibility line as seen by consumers as a group, of which the price line  $P_1P_1$  used in earlier diagrams is but a segment). What we have to do is to establish the point  $Q'_1$  as the chosen consumption position (where the horizontal distance between  $Q'_1$  and  $Q_1$  is the amount of clothing to be taken by the Government). If we draw in the community indifference curve passing through  $Q'_1$ , and draw the tangent to it at that point, we shall arrive at a line such as  $DE$ . If this could be established as the new consumption possibility line, we know that  $Q'_1$  will be the chosen point on it, and the problem will have been solved.  $DE$  can in fact be so established in a number of ways, the two simplest being shown in figure 12.12. Firstly, levy an income (or strictly speaking a lump-sum) tax that shifts  $AB$  to  $CD$ , and give a subsidy on food so as to shift  $CD$  to  $DE$ . Alternatively, levy a tax on clothing so as to shift  $AB$  to  $AF$ , then make a lump-sum transfer payment that shifts  $AF$  to  $DE$ . Note, however, that whatever method is used to establish  $Q'_1$  as the chosen position, consumers will be worse off than they were in the earlier case where they were allowed to adjust to  $Q'_2$ . This is so because the curve  $UU'$  includes all points where the given amount of clothing ( $T'U'$ , which

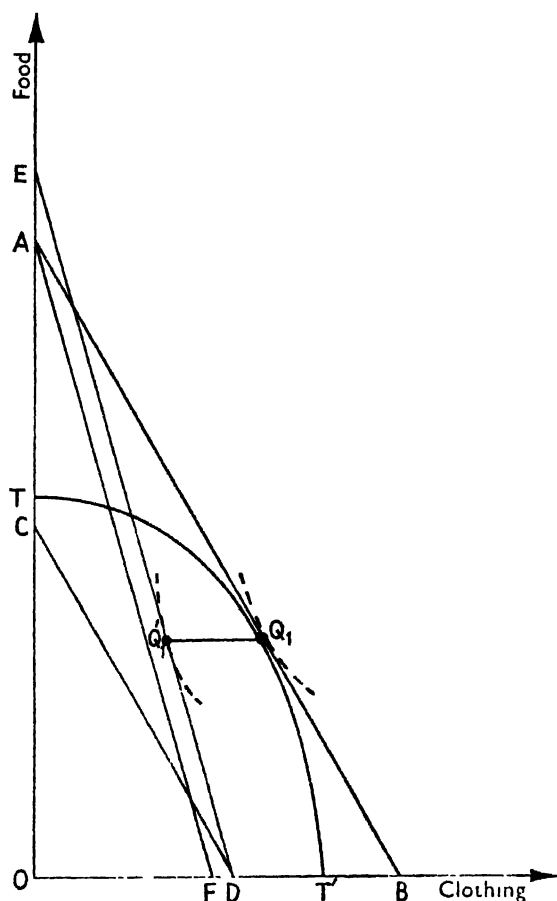


Figure 12.12

equals the horizontal distance between  $Q'_1$  and  $Q_1$ ) has been removed from  $TT'$ , so that the point  $Q'_1$  must itself lie on  $UU'$ . We already know that of all the points on  $UU'$ , the community prefers  $Q'_2$ , so that  $Q'_1$  must be an inferior position.

If the Government is now assumed to purchase factors (say labour) instead of final goods and services, the outcome is somewhat different. Let us suppose that it buys labour at the current market price, competing with private producers, just as it competed with private consumers for the clothing it wanted in the preceding dis-



cussion. Once more, we will assume that it is determined to have a fixed amount of labour, and that it will make whatever outlays are required for this purpose. The result will be that the production possibilities for food and clothing will be reduced (because less labour is now available), so that there will be a new production possibility

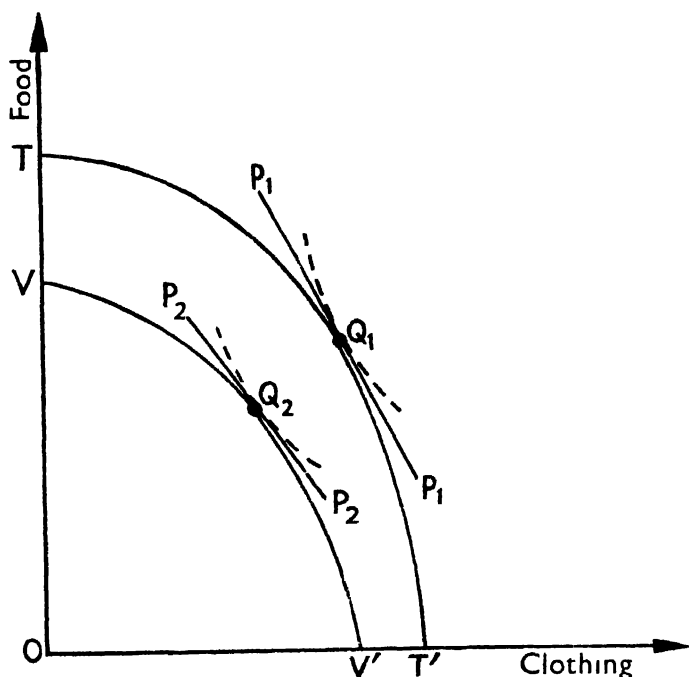


Figure 12.1

curve such as  $VV'$  in figure 12.13. This shift is similar to the shift that occurs from a voluntary withdrawal of labour by its suppliers when taxes have disincentive effects (compare, for instance, the shift from  $TT'$  to  $T_1T'_1$  in figure 12.9 above). If, on  $VV'$ , the chosen combination is  $Q_2$ , then relative prices and production will shift accordingly, in this case with food relatively more expensive than before (it being assumed that the lack of labour curtails food production more than the demand for food is reduced by the fall in disposable incomes). The Government's policy in this case could be to levy direct taxation at a rate sufficient to raise precisely the amount of money it has to pay out in wages, for in that way the purchasing

power of that part of the labour force which is in public employment (which is not taken account of in the consumption possibility line  $P_2P_2$  in figure 12.13) will be exactly offset by the taxation taken from all individuals.

## (B) A MODEL WITH SHIFTS IN INCOME DISTRIBUTION

The whole analysis so far in this chapter has been based on the assumption that this community of individuals is so homogeneous in circumstances and outlook that it is sensible to consider the community as a whole as having a consistent and unambiguous set of preferences between the various outcomes. It is now time to drop this assumption and consider the possibility that conflicts of interest may arise within the community, e.g. one group may be better off and the other worse off in the new situation than in the old. The most obvious element in the situation that may make for such divergences of interest is the distribution of income. In this section we shall, therefore, extend the analysis to take account, in a rough and ready way, of changes in the distribution of incomes, via changes in relative factor prices and uneven ownership of factors between the individuals in the community.

### (i) THE BASIC DIVISION OF OUTPUT

We shall postulate that consumers may be divided into two distinct classes, those whose incomes are derived solely from supplying labour, and those whose incomes are derived solely from supplying capital. This is just as artificial as the original assumption that all incomes were identical, of course, but so long as people's incomes are in fact derived in differing degrees from various types of factor ownership, the conclusions drawn here will still be valid in principle.

The important technical implication of this change for our analysis is that it is no longer valid to draw a set of community indifference curves, since conflicts of interest may arise between the two groups, even if their tastes are identical. For the sake of simplicity, it will still be assumed that incomes are identical within each group, but between the two groups marked differences may occur. This will be formalized by introducing a 'division of output' curve into the diagrammatic analysis, as shown by  $JK$  in figure 12.14. This indicates that if output is  $Q_0$  (i.e.  $OC_0$  of clothing and  $OF_0$  of food) then the amount which will accrue, in the form of purchasing power, to the

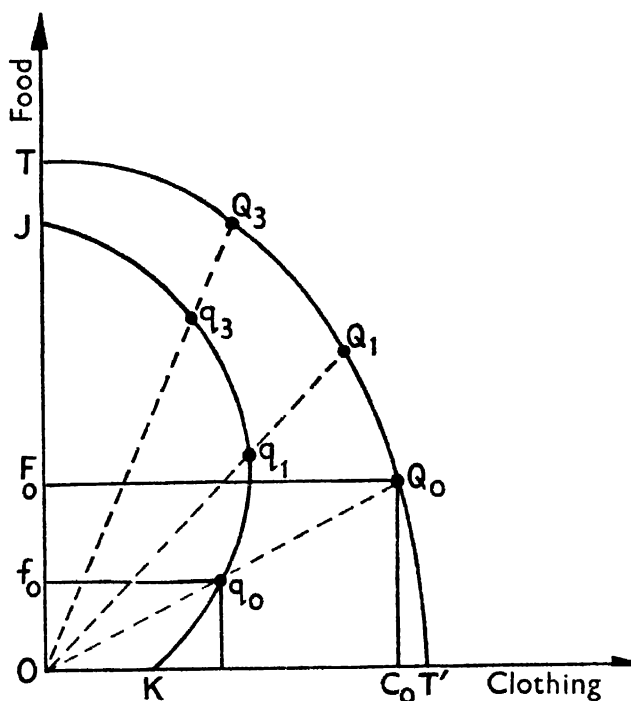


Figure 12.14

suppliers of labour will be  $q_0$  ( $Of_0$  of clothing and  $Ok_0$  of food), while the rest ( $c_0C_0$  of clothing and  $f_0F_0$  of food) will accrue to the suppliers of capital. In other words, total output is divided between labour and capital in the ratio  $Oq_0 : q_0Q_0$ . As the composition of output changes, so as to increase the amount of food and decrease the amount of clothing that is produced, then the demand for labour increases relatively to that for capital, and since factor supplies are assumed fixed, the price of labour will rise relatively to that of capital, so that a higher proportion of output will accrue to the suppliers of labour. Thus at  $Q_1$  in figure 12.14,  $Oq_1$  is a larger proportion of  $OQ_1$  than  $Oq_0$  was of  $OQ_0$ , while  $Oq_3$  is a still larger proportion of  $OQ_3$ . In most subsequent diagrams the curve  $JK$  will not be drawn in, but only the relevant points on it, such as  $q_0$ ,  $q_1$  and  $q_3$ , so as not to introduce unnecessary complications.

With the help of figure 12.15, we can now re-examine, in terms of this new set of assumptions about income distribution, the initial equilibrium situation as set out earlier in figures 12.2 and 12.3.



can be distributed between food and clothing. Thus, in figure 12.15, the line  $AB$  through  $q_1$  parallel to  $P_1P_1$  gives us the consumption possibilities facing each group. Taking  $O$  as the origin for labour, their possibilities are measured off along  $AB$  in the usual way. In the case of the suppliers of capital, the diagram has, as it were, to be turned upside down, with their possibilities being measured off from  $Q_1$  as their origin, but still taking  $AB$  (from the other side) as the consumption possibility line. So long as each group, from its respective origin, chooses the same point on  $AB$ , then total demand will equal total supply, and  $Q_1$  will be an equilibrium position. Such an equilibrium solution is shown in figure 12.15, where  $\bar{q}_1$  is the point on  $AB$  which is tangential both to one of labour's indifference curves ( $ll$ ) and to an indifference curve of the suppliers of capital ( $cc$ ). The suppliers of labour want  $O\bar{f}_1$  of food and  $O\bar{c}_1$  of clothing, while the suppliers of capital want  $\bar{f}_1F_1$  of food and  $\bar{c}_1C_1$  of clothing. In this way the sum of their respective demands for each of the two commodities will be equal to the amounts being produced. This is thus a more complicated variation of the analysis conducted earlier with respect to figure 12.3.

## (ii) THE EFFECTS OF AN INDIRECT TAX

The process of adjustment when a tax is imposed on clothing will again be broken down artificially into distinct stages as before. The output  $Q_1$  will already have been produced, and the distribution of income  $q_1$  already determined. Again it will be assumed that the tax proceeds are returned to each taxpayer in the form of a lump-sum transfer. But the consumption possibilities are no longer represented by the line  $AB$  based on pre-tax prices (as in figure 12.15), but (as shown in figure 12.16) by the line  $CD$  for the suppliers of labour (comparable to  $DE$  in figure 12.4), and analogously by  $EF$  for the suppliers of capital (to be read off using  $Q_1$  as the origin). Thus the owners of labour will move from  $\bar{q}_1$  to  $\bar{q}_1'$  (and to a lower indifference curve  $mm$ ), while the owners of capital will move from  $\bar{q}_1$  to  $\bar{q}_1'$  (and to a lower indifference curve  $dd$ ). If these respective demands are now totalled, it will be found that the demand for food has increased ( $O\bar{f}_1'$  plus  $Q_1\bar{f}_1'$  is greater than  $OF_1$ ) and that for clothing has fallen ( $O\bar{c}_1'$  plus  $Q_1\bar{c}_1'$  is less than  $OC_1$ ), just as in the earlier, less complex, analysis (see figure 12.5). The pre-tax prices of food and clothing will now change in response to the excess demand and excess supply respectively, as before, and this shift in the price line will bring forth not only a production shift (more food and less clothing) but also a shift in income distribution (a higher proportion going



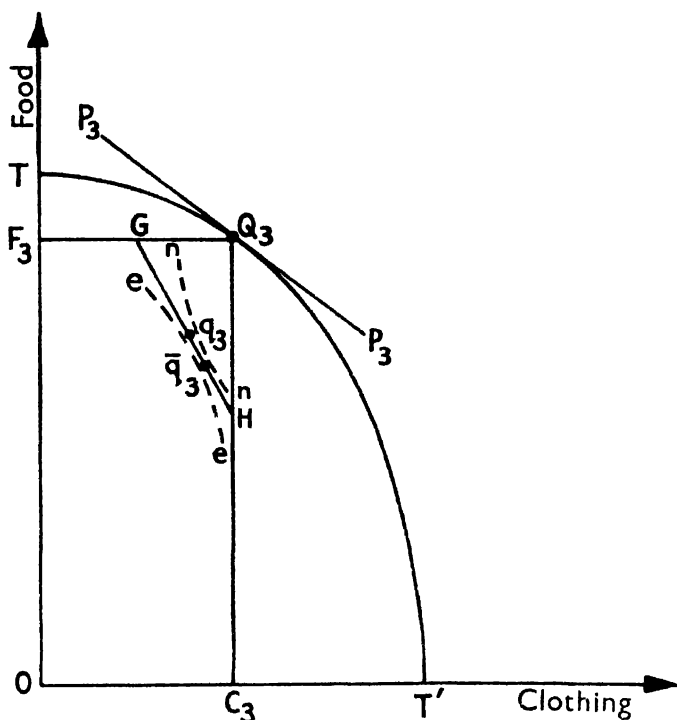


Figure 12.17

12.7 earlier, will have the properties shown in figure 12.17. Here, the equilibrium output is again designated as  $Q_3$ , based on the price line  $P_3P_3$  which takes no account of the tax on clothing. The income distribution associated with  $Q_3$  is  $q_3$ , and the consumption possibility line (common to both, since this is an equilibrium position) is  $GH$ , which is based on relative prices including the tax on clothing (as was  $P_3^T P_3^T$  in figure 12.7). On this line, the chosen point for both groups is  $\bar{q}_3$ . Here an important difference in interpretation, by comparison with the earlier analysis must be noted. It concerns the welfare implications of the new position compared with the old. In figure 12.7 we simply noted that  $Q_3$  was on a lower community indifference curve than  $Q_1$ . Here we have no such simple guide, for we have to consider the welfare of each group independently. This is done in figures 12.18 and 12.19. Figure 12.18 compares the initial and final equilibrium positions ( $\bar{q}_1$  and  $\bar{q}_3$  respectively) from the point of view of the suppliers of labour. Clearly, in the case we have

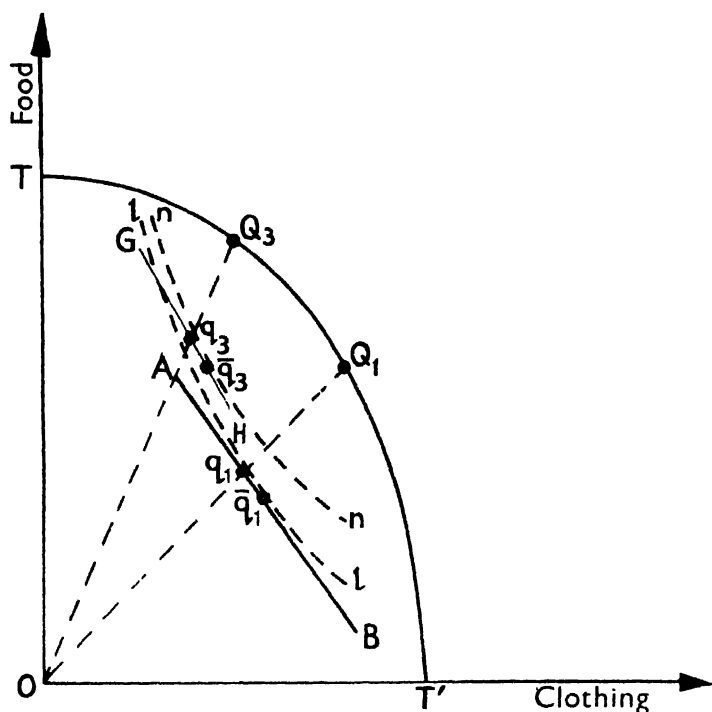
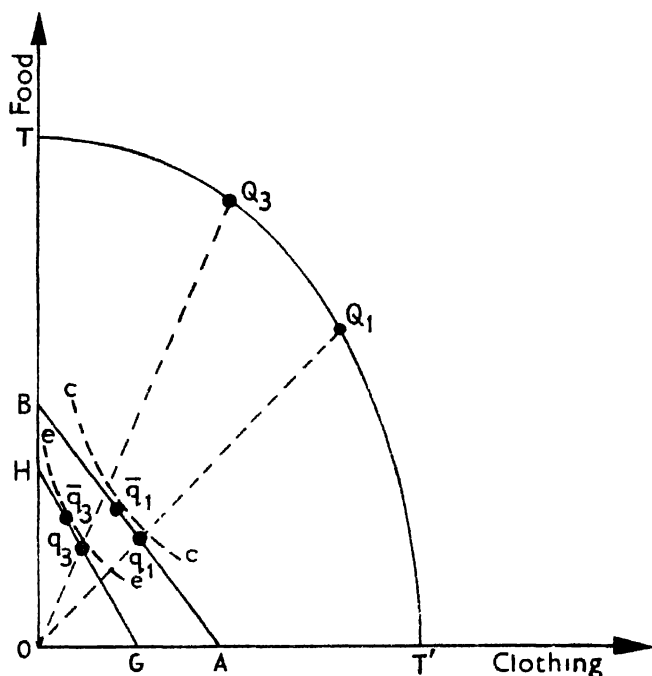


Figure 12.18

presented here, this group is better off with the indirect tax and the lump-sum transfer (at  $\bar{q}_3$  on indifference curve *mn*) than without them (at  $\bar{q}_1$  on indifference curve *ll*), or, what we have already seen to be the same thing when factor supplies are fixed, than with an income tax and a lump-sum transfer of like amount. This is because the disadvantages of an indirect tax in its price-distorting effects on choice, is more than outweighed in this case by the beneficial effects on the incomes of labour-suppliers from the switch to a greater production of food. If we then carry out a similar comparison for the suppliers of capital, redrawing *AB* and *GH* as from a common origin *O* in figure 12.19, instead of from  $Q_1$  as in figure 12.15 and from  $Q_3$  as in figure 12.17 respectively, we are led to a different conclusion for them. The suppliers of capital are obviously worse off (on indifference curve *ee*) at  $\bar{q}_3$  than they were (on indifference curve *cc*) at  $\bar{q}_1$ . Putting this conclusion in terms of indirect vs. direct taxes, we find that they will prefer the direct to the indirect, assuming all the





time that each individual's tax payment is returned to him in the form of a lump-sum transfer. Summing up our findings in this more complex case, then, we might say that some will be better off under the indirect tax, and others under the direct tax. It should also be added that it is quite conceivable that both groups be worse off under the indirect tax, but it will now be clear that this need not necessarily be so. It depends to a large extent upon the relative magnitude of the income shifts due to factor price changes compared with the effects on consumption through price changes. Moreover, it must be emphasized that these redistributive effects are not direct ones operating through the budget itself (in every case tax payments are remitted to each individual as lump-sum transfers) but are incidental effects flowing from general adjustments to these budgetary measures.

### (iii) VARIATIONS IN TRANSIERS

In the analysis so far, attention has been concentrated on taxes, with lump-sum transfers being used simply as a sort of counterweight



then distributed entirely to the suppliers of capital, this shifts their possibility line to  $DE$  too, so that both groups have to make their choices somewhere along this line. The position of their chosen points depends on their respective elasticities of demand for the two commodities. It may be that the choice is as shown in figure 12.20, with  $\bar{q}_1^1$  being the preferred combination for the suppliers of labour, and  $\bar{q}_1^c$  that for suppliers of capital, but these respective positions could well be reversed in other circumstances. However, in the example illustrated in figure 12.20, there will be an excess demand for food, and an excess supply of clothing, so that there will be a production shift towards more food, which will continue until some such outcome as

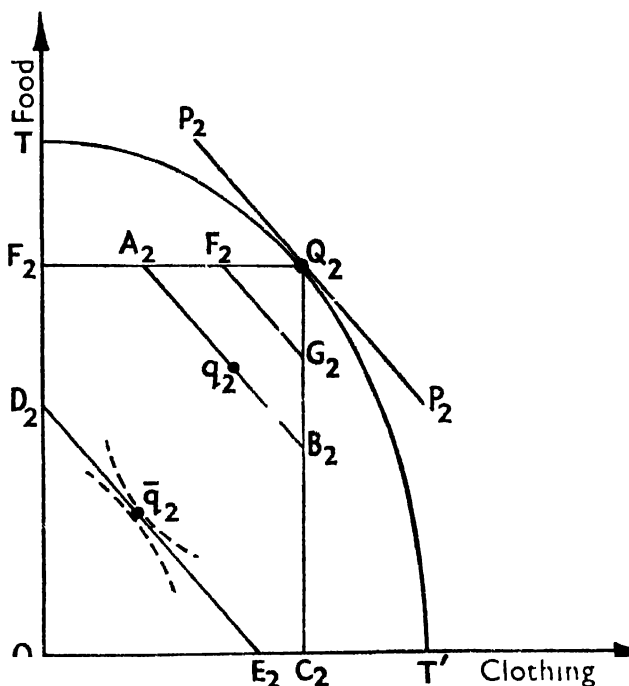
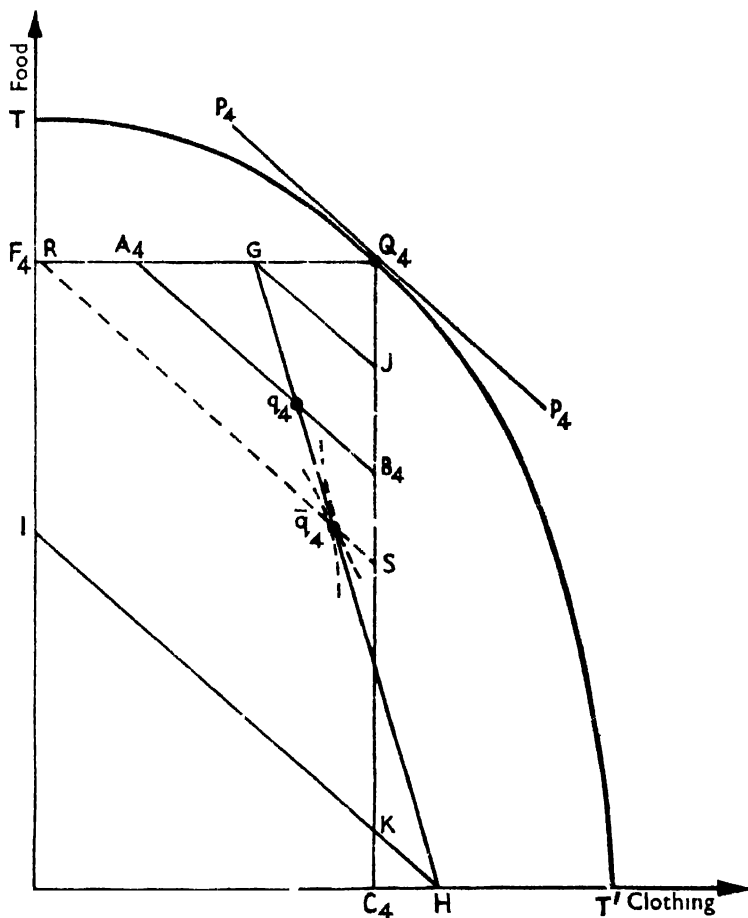


Figure 12.21

that shown in figure 12.21 is established, where equilibrium has once more been restored, with both groups choosing  $\bar{q}_2$  on  $D_2E_2$ . In this case there is no doubt that the owners of capital are better off and the owners of labour worse off, for we have assumed a large ostensible redistribution through the budget, and a relatively small offsetting



But much more complex measures than these are often used to implement a policy of income redistribution through the budget. For instance, let us investigate the situation in which the Government levies a simple proportional income tax and uses the proceeds to pay a simple proportional subsidy on the price of food. Thus, in figure 12.22, the economy was originally in equilibrium producing  $Q_1$  with each group choosing to be at  $\bar{q}_1$  on the price line  $AB$ . The simple proportional tax on income shifts the respective possibility lines to  $JD$  and  $EK$ , and the Government has then to calculate what rate of subsidy the proceeds of this tax will finance. To be successful in this



**Figure 12.23**



figure 12.22, the post-subsidy possibility lines are  $CD$  and  $EF$ , on which the chosen points are  $\bar{q}_1'$  and  $\bar{q}_1''$  respectively, and these points both lie on the line  $RS$  which is parallel to  $AB$ . It will be noted here that the amount of subsidy received by each group does not equal the amount of tax paid by that group, for  $RS$  does not coincide with  $AB$ , even though the aggregate receipts and payments by the Government are the same.

In this situation, the total amount of food demanded is greater than the supply, and the total demand for clothing is less than the supply. The now familiar adjustment process will therefore take place, shifting the production structure towards food, and the income distribution (before tax or subsidy) towards labour. This process of adjustment will end when some such situation as that depicted in figure 12.23 is reached. In this new equilibrium position,

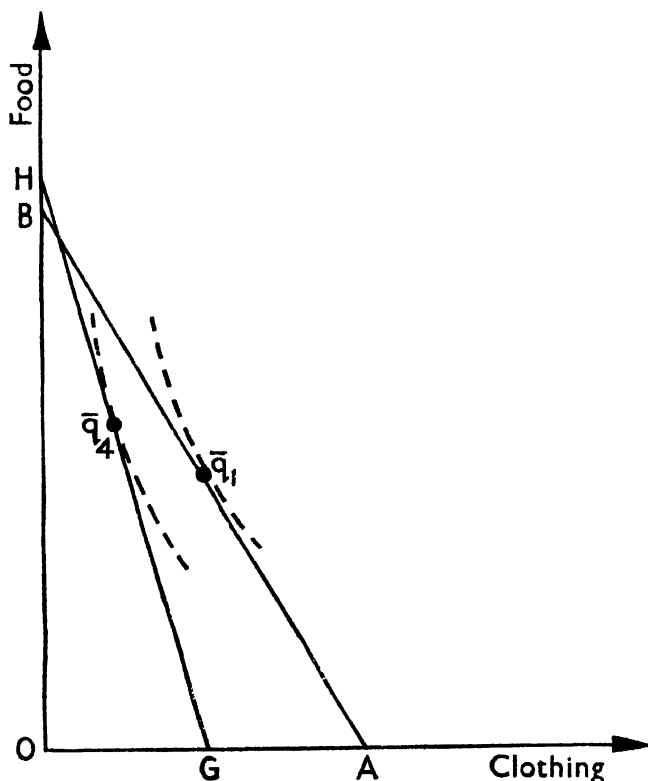


Figure 12.25

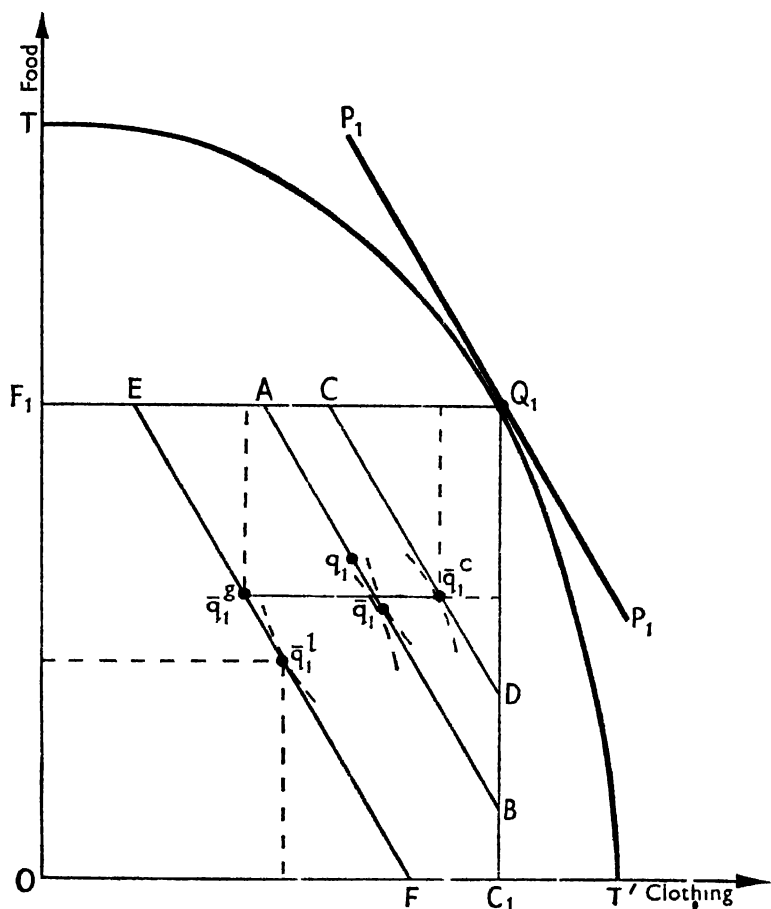
total output has shifted to  $Q_4$ , with the basic income distribution given by  $A_4B_4$  parallel to  $P_4P_4$  through  $q_4$ . The proportional income tax shifted this line to  $HI$  and  $GJ$ , and the subsidy on food shifts both these possibility lines back to  $GH$ , on which both groups choose to be at  $\bar{q}_4$ . The line  $RS$ , parallel to  $AB$  through  $\bar{q}_4$ , indicates the *ostensible* redistributive effect of the budget. It shows that the owners of labour get less direct benefit from the subsidy ( $SK$ ) than the amount that they pay in tax ( $KB_4$ ), whereas the owners of capital get more in subsidy ( $JS$ ) than they pay in tax ( $JB_4$ ).

It would be quite wrong, however, to jump to the conclusion that the former group are therefore worse off, and the latter group better off, as a result of these budgetary measures. A more careful appraisal of this particular situation will in fact show that both groups are worse off than they were before, as will be seen by consideration of figures 12.24 and 12.25. Figure 12.24 compares the points  $\bar{q}_1$  and  $\bar{q}_4$  (from figures 12.22 and 12.23) from the point of view of the owners of labour (compare figure 12.18 earlier). Figure 12.25 does the same for the owners of capital (compare figure 12.19 earlier). It is clear from these diagrams that both groups are worse off at  $\bar{q}_4$  than they were at  $\bar{q}_1$ . In the case of the owners of labour, this is because the favourable shift in income distribution is not large enough to outweigh the direct adverse budgetary effect mentioned above, whereas in the case of the owners of capital, the unfavourable shift in the distribution of incomes more than cancels out their direct budgetary gain. Clearly, other outcomes than those illustrated here are possible, but the important point which emerges is that the effects of budgetary measures cannot be assessed simply by their ostensible effects on income distribution, etc. The effects on the structure of production, and upon the distribution of factor incomes, must also be taken into account.

#### (iv) PURCHASES OF GOODS, AND TRANSFERS IN KIND

At this stage we can re-examine the effects of Governmental purchases of goods, this time not merely for 'absorption' from the private sector as in section (A) (v) above, but also for making transfers in kind. First of all let us recast, in terms of the present model, the case illustrated earlier in figure 12.11, where the Government decides to purchase a fixed amount of clothing at the going price. In figure 12.26 the initial consumption possibility line is  $AB$  and the chosen point for each group  $\bar{q}_1$ . The Government then imposes a simple proportional income tax which shifts the consumption pos-





sibility lines to  $CD$  and  $EF$ , on which the points  $q_1'$  and  $\bar{q}_1'$  respectively are chosen. When the Government's fixed demand for clothing ( $=EC$ ) is added to  $\bar{q}_1'$  we get  $\bar{q}_1''$ , and it will readily be seen that this leads to an excess demand for clothing and an excess supply of food. The consequent change in relative prices will bring about a production shift towards more clothing, a consequent shift in income distribution, and so on, until a new equilibrium is established such as that depicted in figure 12.27. Output is now  $Q_2$ , the basic consumption possibility line  $AB$  (through  $q_2$ ), and the post-tax possibility lines



favour of the suppliers of capital, but both groups are nevertheless worse off than they were at  $\bar{q}_1$ .

A second interesting case is that in which the purchased goods are distributed in the form of transfers in kind, to either or both of the groups in the community. In order to take a specific case, let us assume that the clothing is to be distributed to the suppliers of labour. To discover the effects of this, we can turn again to figure 12.26. The amount of clothing to be distributed to the suppliers of labour is  $EC'$ , which means that the consumption possibilities for them start from the assumption that they already have  $EC$  of clothing. Otherwise, beyond this minimum amount of clothing their possibilities are given by  $CD$ , which lies to the right of  $EF$  by the amount  $LC$ . Whether there will be any production shift or not depends on the point that they choose on  $CD$ . If they choose the point  $\bar{q}_1$  there will be no further adjustments. If they choose a point nearer  $C$  than this, production will shift towards more food, and if they choose a point nearer  $D$  production will shift towards more clothing. The important point here is that such transfers in kind only have a different effect upon behaviour from that which a lump-sum cash transfer would have had, if the amount of the good received by the individuals is greater than the amount that he would have bought anyway (allowing for the income effect of the transfer). If it is not greater than this, he will simply adjust his cash purchases residually, so as to achieve this chosen consumption pattern as before.

#### (v) PURCHASES OF FACTORS AND VARIATIONS IN FACTOR SUPPLIES

The effects of Governmental purchases of factors have already been examined (see figure 12.13) for the simple case where changes in income distribution can be ignored. In the more complex model with which we are now working, some further adjustments are required before this type of Governmental activity can be incorporated into the analytical framework.

Thus in figure 12.28,  $V'V''$  represents the production possibilities for food and clothing when the amount of labour available to the private sector has been reduced by Governmental purchases of labour for other purposes (compare  $VV'$  in figure 12.13 earlier). The new division of output line (comparable to  $JK$  in figure 12.14 above), relevant to the new production possibility line  $V'V''$ , is shown in figure 12.28 as  $J_1K_1$ . This only shows the division of incomes arising in the private sector, however, so that to it must be added the incomes derived from supplying labour to the public sector. We

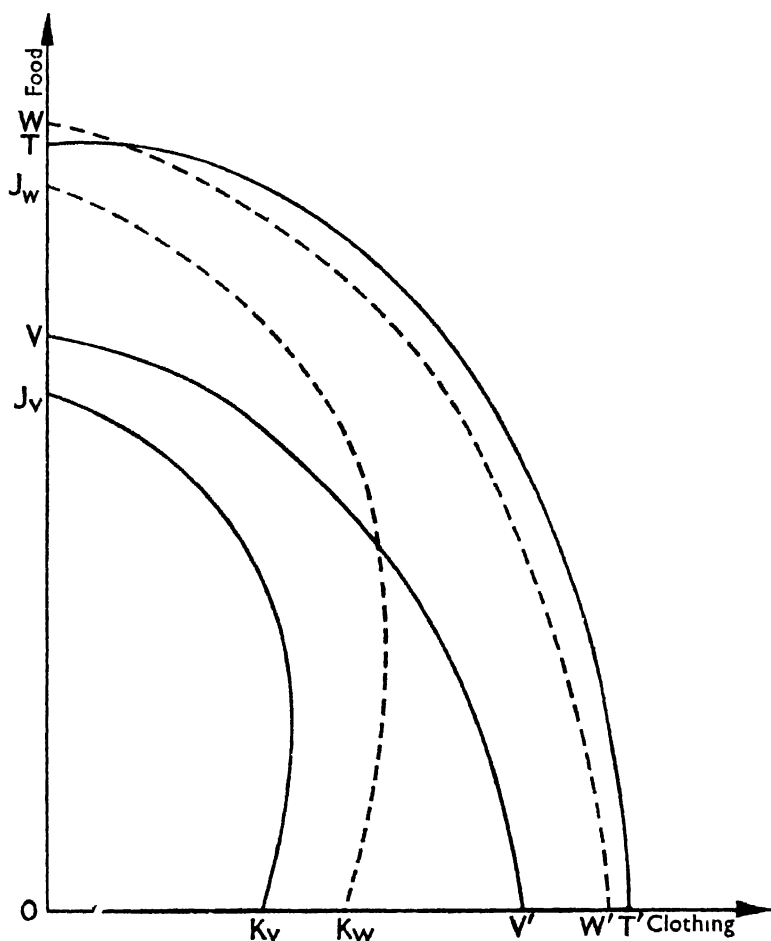


Figure 12.28

shall assume that the labour employed by the public sector is paid at the same rate as labour gets in the private sector. Thus in order to get the total income received by all suppliers of labour, one has to extend income accruing to privately employed labour by whatever proportion publicly employed labour bears to privately employed labour. Let us assume that this results in labour's share of total income expanding from  $J_v K_v$  to  $J_w K_w$  in figure 12.28, with total income being shown as  $WW'$ .

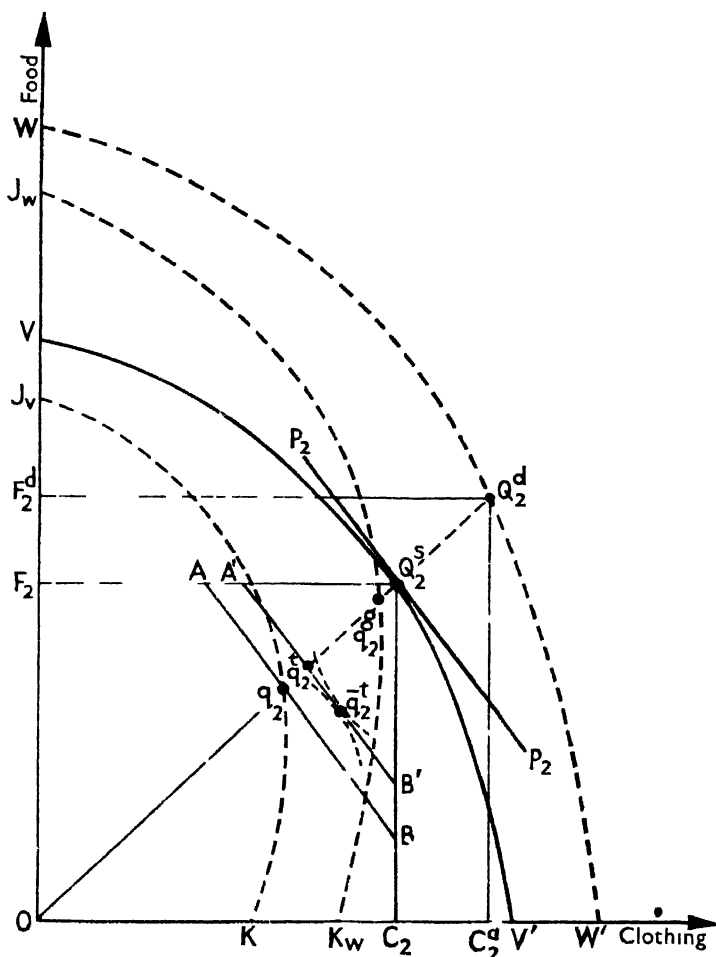


Figure 12.29

With the aid of these new tools of analysis, transferred to figure 12.29, we can now re-examine the properties of the equilibrium situation depicted earlier in figure 12.13 as  $Q_2$ . This is shown in figure 12.29 as  $Q_2^s$ , indicating that the supply of goods by the private sector amounts to  $OF_2$  of food and  $OC_2$  of clothing. If incomes were generated only in the private sector, the consumption possibility line would be  $AB$  through  $q_2$  on  $J_1K_1$ , but in fact total income (i.e.

purchasing power) will be  $Q_2^d$  on  $WW'$ , shared in the proportion  $Oq_2^o : q_2^o Q_2^d$  between labour and capital respectively. Thus total demand ( $Q_2^d$ ) would exceed total supply ( $Q_2^s$ ) in the absence of further Governmental measures. The Government must therefore reduce the volume of purchasing power, and one way of doing this would be to levy a proportional income tax on both groups at the rate  $\frac{Q_2^s \cdot Q_2^d}{OQ_2^s}$ , i.e. the proportion that the excess demand bears to the total supply (the desired level of demand). This would shift total purchasing power from  $Q_2^s$  to  $Q_2^d$ , and labour's share from  $q_2^s$  to  $q_2^d$ . The possibility line would then be  $A'B'$  (parallel to  $P_2P_2$ ), and for an equilibrium both groups are required to choose the same point on this line, e.g.  $\bar{q}_2^d$ .

To determine whether this outcome is better or worse for each group than when the Government did nothing, requires not only a comparison between  $\bar{q}_2^d$  in figure 12.29 and  $\bar{q}_1$  in figure 12.15, but also an evaluation of the benefits accruing to each group from whatever it is that the Government is doing with the labour it is employing (even though these services may not be sold back to consumers on the market). A proper assessment of the situation therefore requires an analysis of the interplay of (a) the production shift in the private sector (b), the income distribution in the private sector, (c) the incomes generated in the public sector, (d) the tax measures chosen, (e) the changes in the relative prices of the two goods, (f) the relative demand patterns of the two groups, and (g) their respective valuations of the Governmental activities to which labour has been diverted.

If, finally, we analyse the effects of variations in factor supplies within this model, we shall see once more that the conclusions of the earlier analysis have to be modified somewhat. In order to simplify the situation a little, let us once more assume that only the supply of labour is affected, the supply of capital remaining fixed throughout. Thus, in figure 12.30, the surface  $CFL$ , the transformation curves  $TT'$  (at  $L_1$ ) and  $T_1T'_1$  (at  $L_2$ ), and the points  $Q_1$  and  $Q_2$  are the same as in figure 12.9 above. What is new is the division of output surface,  $JRL$ , lying inside the transformation (or production possibility) surface. This division-of-output surface performs the same function in the three-dimensional analysis as did the division-of-output line in the two-dimensional analysis (see figure 12.14). Thus a reduction in the amount of labour supplied, which shows here as an increase in the amount of leisure taken, will not only reduce the production possibilities, say from  $Q_1$  on  $TT'$  to  $Q_2T_1T'_1$ , but also shift the basic income distribution from  $q_1$  (on the line from  $L_1$  to  $Q_1$

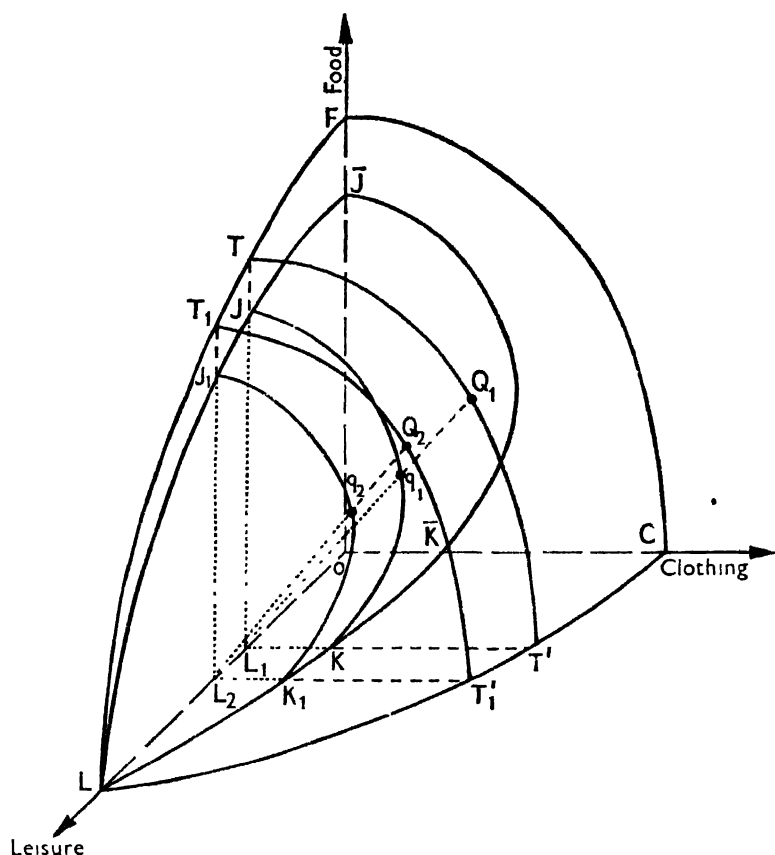


Figure 12.50

where it intersects the plane  $JKL$ ) to  $q_2$  (at the intersection of the line from  $L_2$  to  $Q_2$  with  $JKL$ ). What then is required is a careful assessment of the welfare implications of this effect on income distribution, together with all the other considerations mentioned earlier, which it would be tedious to repeat here. One point that might be stressed however, is that the position in which the suppliers of capital find themselves is altered even though they themselves do not react to the Government's measures directly, so, the change in labour supply will affect their rewards as suppliers of factors as well as affecting the relative prices of the goods they buy as consumers.

### (C) SOME CONCLUDING OBSERVATIONS

This chapter has been concerned with problems of structural adjustment in an economy, and in order to render the analysis manageable, it has been conducted within a rather simplified logical framework. In spite of this, the analysis became quite complicated at times, and the conclusions reached even with this rather simple model of the economic system indicate clearly how complex are the interrelationships that have to be elucidated and evaluated before a proper assessment of the impact of Governmental activities upon the structure of the economy can be undertaken. There is one important simplification that cannot be allowed to pass without further comment however, and that is the one which postulates that incomes are wholly spent on food and clothing, so that no saving takes place. This assumption will be re-examined in the first part of this concluding section of this chapter. The rest of this final section will be concerned with the implications of our analysis for the general problem of incidence, for the 'transfer problem', and for the limits of taxable capacity.

#### (i) SAVING AND CAPITAL FORMATION

In establishing an equilibrium position in our analysis, we have assumed that the payment of tax, or the receipt of subsidy, has a one-to-one effect on consumer spending. This is clearly unrealistic, since we have already seen from the earlier micro-analysis that such taxes and subsidies will usually affect saving too. The purpose of this simplification has been to enable attention to be focused wholly upon the effects of budgetary measures upon consumer spending, for it is this aspect of the adjustment that is of prime importance here. If we now wish to take note of the complications associated with a marginal propensity to consume out of income which is less than one, it is not difficult to see what this implies for our analysis. It means that part of the effect of the taxes or subsidies is 'dissipated', as it were, through changes in saving rather than changes in consumption, so that if a certain effect on consumption is required, the tax or subsidy measure has to be that much stronger. This point will be taken up more fully in the next chapter.

As regards income distribution in particular, there is now introduced a further possible field for a differential impact upon the two groups, if their marginal propensities to consume differ. Thus it is commonly held that since poorer people have a higher marginal propensity to consume than do rich people, taxes on consumers'



goods tend to hit them harder, and any desired change in the general level of consumption can be achieved more readily by directing budgetary measures at them than by directing them at the richer people. Again, it is necessary to insist that judgments of this kind only be made after all the repercussions of the budgetary measures have been taken into account, and not just their ostensible effects. Otherwise, all that need be added here is that the preceding analysis has to be interpreted carefully so as to allow for possible savings reactions which we have hitherto ignored.

Similar simplifying assumptions have been made concerning the demand for capital and its supply. The whole problem of capital formation is one with which economists have had, and continue to have, the greatest difficulty. In a static analysis of this kind it can only be treated sketchily, and quite inadequately. Obviously, the long-run adjustment of the economic structure depends in a crucial way upon the pattern of investment, both in material goods and in human skills. Although the analysis of this chapter has been used to throw some light on part of this problem, in general it has been evaded by taking the capital supply as fixed, and treating the demand for capital as being related in a very simple way to the output of food and clothing. Further consideration will be given to the role of investment in the next two chapters, but it must nevertheless be admitted that for a satisfactory treatment of the problems in this field, a much more complex, dynamic model of the economy is required, which lies outside the scope of this book.

(ii) INCIDENCE, THE TRANSFER PROBLEM,  
AND TAXABLE CAPACITY

Much of the interest shown in the economics of public finance and budgetary policy has been centred upon the problem of assessing the incidence of a tax or subsidy. One of the main purposes of this book is to show that such an assessment cannot be made satisfactorily just by looking at the direct transactions between Government and taxpayers (or subsidy receivers). Yet a common method of estimating the incidence of a set of budgetary measures is to draw up a sort of 'balance sheet' between the cash payments made by each group by way of taxes, and their receipts by way of direct transfers or other subsidies, with the benefits of other Governmental services apportioned (at a cost of production valuation) in some more or less arbitrary way. In this way, some groups are found to be 'net gainers' (their tax payments are less than their receipts) and others 'net losers' by the Government's measures. We have already seen that this

kind of approach is quite inadequate, for it takes no account of the production shifts, the consequent changes in the distribution of factor incomes, or the changed pattern of demand that may result. And this superficial treatment of the problem is not simply misleading because of any underestimate or overestimate of the incidence of the budget that it may give rise to, but more fundamentally because it may not even get the direction of change right (i.e. it may designate as 'gainers' people who are really 'losers', and vice versa). The most clear-cut example of this would be in the apportionment of a tax on a commodity which one group of people were forced to give up buying because of the tax. Because they then pay no tax, they will *not* be counted among those who are 'losers' by the tax, whereas the people who give up something else to keep on buying the taxed good *will* be considered 'losers'. Moreover, the former group may find their incomes reduced (if their incomes depend on the prosperity of the industry producing the taxed good), while the latter's incomes may rise (due to the demand switch to other goods).

One aspect of the impact of budgetary measures in general that we have not dealt with explicitly so far is the so-called 'transfer problem'. In our model of the economy, the population was arbitrarily divided into two groups, the suppliers of capital and the suppliers of labour. But other classifications might equally well have been adopted, e.g. those whose incomes are earned in the one industry as against those depending on the other, or between rich and poor, or on some geographical basis. Obviously, the division of output line ( $JK$  in figure 12.14) would be different in each of these cases, but the main lines of the analysis could have been pursued more or less as before. There is, however, one reclassification that merits further examination, and that is the one between 'productive' and 'unproductive' members of the community, for it is transfers between these classes that assumes a major importance when the budget becomes a major vehicle for social welfare provisions.

In order to have a concrete example to discuss, let us assume that food and clothing are made available by the Government for the use of the very young, the very old, the sick, disabled and unemployable. This kind of situation was touched upon earlier when we considered the 'absorption' by the Government of goods and factors from the private sector (see section (A) (v), (B) (iv) and (B) (v) above). We can consider what was there called the private sector the 'productive' group, with the diverted resources being transferred, via the Government, to the 'unproductive' group. Concern is often expressed as to whether such transfers will not have serious disincentive

effects, and so on. The answer is that such transfers will have all the possible effects mentioned earlier, upon the actual composition of output, the distribution of incomes within the productive group itself, and the prices of products and factors, as well as upon the amounts of such factors supplied (which may be to increase them as well as to decrease them). Thus, again, the incidence of such social welfare provisions is no simple matter. It is not just a matter of finding out whether the consumption goods that are transferred are more highly valued (from a social standpoint) in the hands of the one group than in the hands of the other (though that is itself a difficult enough problem to solve), but it is also necessary to assess the valuation to be placed on all these other repercussions as well, and then to weigh them all together to reach an overall judgment in the matter.

Finally, it is often asked whether there is not some economic limit to the extent to which the Government can intervene (especially with a redistributive policy) in the working of an economy. Posed in this bald way the question is incapable of being answered, for both the nature of the 'limit' and of the economy need to be specified. Ultimately the economic limit is reached when the entire system breaks down, but what is usually implied is that at some stage, well before the breakdown point is reached, the disadvantages of further Governmental intervention will outweigh the advantages. Strictly speaking, this is clearly not an economic question at all, but a matter of social valuation, but there are nevertheless some relevant points that are thrown up by the foregoing analysis that would have to be taken into account in making such a valuation. Firstly, it can be asserted quite categorically that any such valuation that concentrated only on taxes, and ignored the effects of the various kinds of Government expenditure, would be incomplete and misleading. Secondly, it will be obvious that, when viewed in this light, the question of taxable capacity presupposes an assessment of the incidence of the budget as a whole, and therefore raises all the problems that we just have been discussing.

## CHAPTER THIRTEEN

### The Stability of the Economy

In the previous chapter, attention was concentrated upon the structural aspects of the economy, its overall stability being ignored. In this chapter, on the other hand, we shall concentrate upon overall stability, and largely ignore structural considerations. We shall therefore be concerned only with the broad aggregates of income, output, consumption, saving, investment, etc., and not with their composition or distribution. There are considerable difficulties in measuring such large, heterogeneous categories in such a way that the total can be used sensibly and without the danger of misleading people. For instance, total consumption means a collection of almost incommensurate goods and services, from housing, fuel, food and clothing to football matches and doctors' services, and the only common yardstick against which they can be set is their money value. It will readily be appreciated that the money values placed on some of these diverse elements are often rather conventional, and in any case they change relatively to each other through time, so that the 'yardstick' itself is not rigid and objective, but rather flexible and partly subjective. In spite of these acknowledged difficulties, in what follows we shall regard increases or decreases in these aggregative concepts as having a clear and unambiguous meaning.

Our first task will be to set up a highly simplified 'model' of the workings of an economy, cast in broad aggregative terms. Because we are deliberately suppressing a great deal of structural detail, the analysis of this chapter will, in many respects, be much less complicated than that of the preceding chapter. This should not be taken as implying that a stabilization policy is necessarily easier to carry out than one aimed at influencing the structure of the economy. What it does mean is that the model required to illuminate the main features of the economy relevant to stabilization policy, can be simpler than that required to bring out its main structural characteristics. It must also be re-emphasized that the separation of the two kinds of policy is quite artificial, and basically arbitrary, and should not be allowed to obscure the fact that measures taken to influence the one will almost certainly also affect the other. Once more the framework

of analysis will be a static (timeless) one. This is a particularly serious shortcoming in the present context, for many of the problems confronting stabilization policy are problems of timing, and the dynamic properties of the economy therefore need to be explored and taken into account if the analysis is to be a satisfying one. Thus matters such as speed of adjustment, sequence of reactions, lags in putting budgetary measures into effect, the formation of expectations, channels of information, and speculative activities, are all important to a full understanding of the problem, yet they are not dealt with here. In extenuation, apart from pleading lack of space, it must be stressed that this book aims only at being introductory, and it has been found that a convenient place to begin studying the economic system is to tackle its 'comparative static' properties. Not only is this a relatively simple approach, but it also enables certain fundamental relationships to be laid bare which have later to be incorporated into the more ambitious dynamic models anyway. Nonetheless, the analysis which follows is incomplete in these important respects and must consequently be interpreted with special care.

Stabilization of the economy can mean many different things. It can mean simply resistance to any kind of change, or just to certain kinds of change (e.g. in prices or wages). More often than not however, what is sought is the absence of any sudden large shifts, with certain other conditions also being fulfilled, e.g. stability of the general price level at full employment with equilibrium in the balance of payments. It is this rather ambitious policy objective that will be taken as our frame of reference here, and the terms 'full employment' and 'stable prices' will be taken at their face value, and not investigated more closely.

It will become evident in what follows that a policy of stability at full employment may well mean deliberately upsetting an equilibrium situation, unbalancing the budget, and generally manipulating the main economic aggregates in a way which at times appears to be anything but 'stabilizing' in a narrower context. However, if the general level of activity in the economy as a whole is to be stabilised at a specified level, particular segments of the economy may have to be subjected to such 'destabilizing' influences in the interests of this wider aim.

### (A) THE BASIC FRAMEWORK WITHOUT GOVERNMENT

#### (i) THE EQUILIBRIUM LEVEL OF NATIONAL INCOME AND OUTPUT

Our first concern is with shifts in aggregate expenditure and their influence on total output. It will be convenient to consider personal income as being used in only two ways, for consumption expenditure and for saving. Consumption expenditure means the actual demand for consumers' goods, and this will clearly vary as the level of income varies. Thus in figure 13.1, consumption (the  $C$ -line) rises from

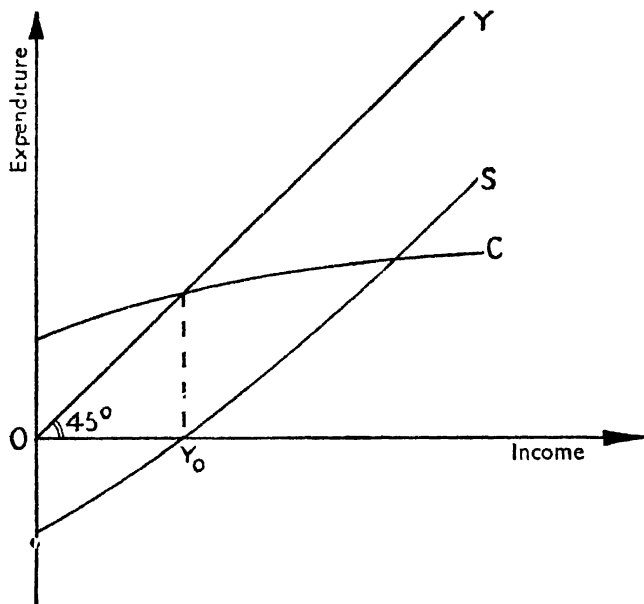


Figure 13.1

left to right, but not as fast as income (the  $Y$ -line) rises, reading the values of both against the vertical axis. The  $C$ -line is also shown as rising at a diminishing rate, indicating that as national income rises, not only does the overall proportion of income devoted to consumption fall, but the fraction of each successive increase in income devoted to consumption also tends to fall. Translated into technical terms, what we have just said is that both the average propensity to

consume (i.e. total consumption divided by total income) and the marginal propensity to consume (i.e. the increase in consumption divided by each successive increase in income) are falling as income rises. At a certain level of income, say  $Y_0$  in figure 13.1, consumption absorbs the whole of income, so that saving (shown by the  $S$ -line) is nil at that level of income. At lower levels of income than this, consumption is kept at a higher level than income by dissaving (the  $S$ -line is in the negative part of the graph, i.e. below the origin  $O$ , for these low levels of income), while at higher levels of income total consumption is less than total income, and saving is taking place. Since saving is regarded as a residual element (income minus consumption) the  $S$ -line can be derived straightforwardly as the vertical difference between the  $Y$ -line and the  $C$ -line. Since the  $Y$ -line is a straight line from the origin at  $45^\circ$  to each axis (if the scale of measurement on each axis is the same), the  $S$ -line will have the opposite curvature to that of the  $C$ -line.

The next important element to be introduced is the level of investment, i.e. the total demand for real capital goods. Many alternative hypotheses are plausible for the relationship between this demand and the level of national income. It could be entirely independent of current levels of income (e.g. the line  $I_0$  in figure 13.2) and based instead on more long-term considerations, or it could be partly related to current income levels but not very sensitively (like

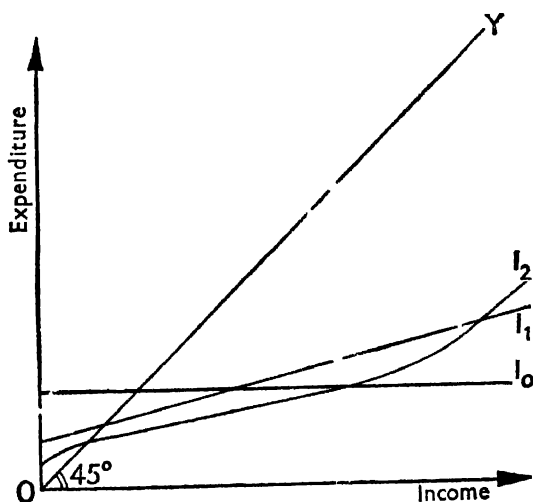


Figure 13.2

$I_1$  in figure 13.2), or it could be a more complex relationship (like  $I_2$ ) in which investment is rather insensitive to current incomes within a certain fairly wide range, but becomes very sensitive outside this range, especially as the economy approaches full capacity operation. Rather than work with a variety of hypotheses in each situation, the ' $I_2$ ' hypothesis will be used throughout, since it is of greater interest than the others for illustrative purposes. Other hypotheses could equally well be used, however, depending upon the circumstances.

The total demands made upon the economic system are the sum of the demand for consumption goods ( $C$ ) and the demand for capital goods ( $I$ ). The supply of all goods and services is given by  $OY$ , for incomes are generated by contributing towards output, and the total value of output and the total of incomes generated in its production will be the same (provided that certain items are imputed if not actually distributed, etc.) So to find the equilibrium level of national income, we must find the level of income (or output) at which total demand ( $C + I$ ) equals total supply ( $Y$ ). In figure 13.3,  $C$  and  $I$  are added vertically to produce the  $C + I$  line, which represents total

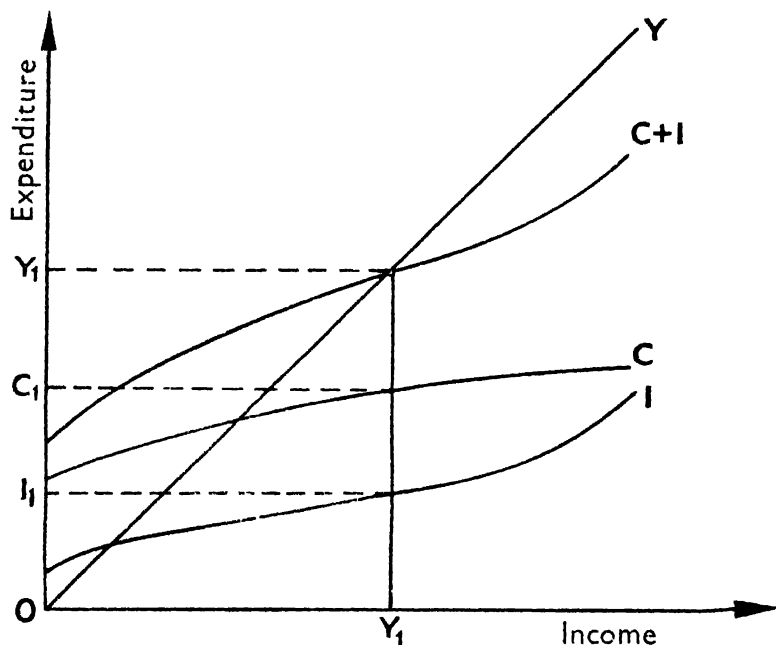


Figure 13.3



demand at each level of income. Since  $OY$  is the supply line, clearly  $Y_1$  is the equilibrium level of income.

Note that this is also the level of income at which investment and saving are equal, for since the value of income  $Y_1$  in figure 13.3 is made up of  $C_1$  and  $I_1$ , and  $Y_1$  minus  $C_1$  equals  $S_1$ , obviously  $I_1$  and  $S_1$  must have the same value. This is shown graphically in figure 13.4,

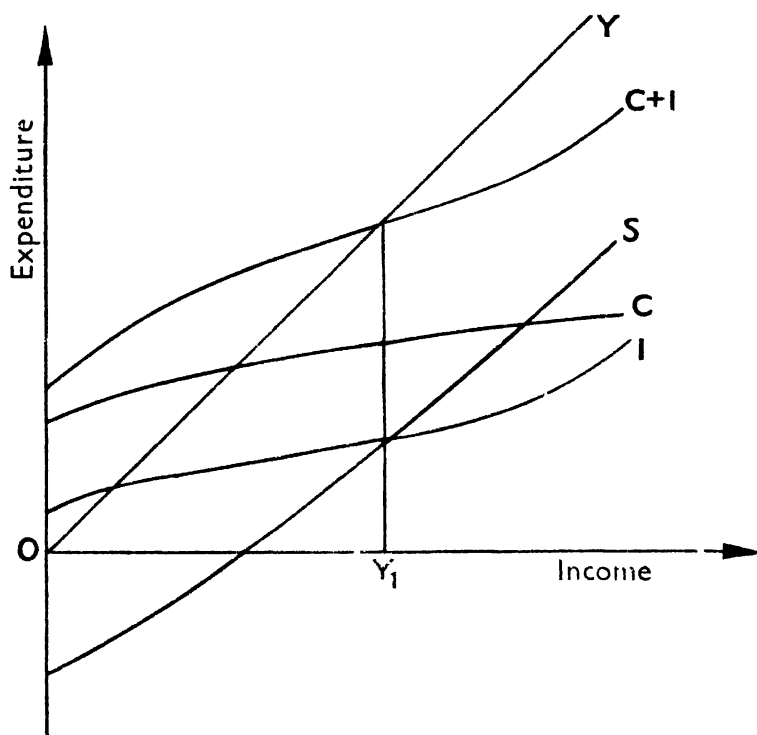


Figure 13.4

where it will also be seen that  $I$  and  $S$  are only equal at  $Y_1$ , and not at other levels of income. The equality of investment and saving is therefore a property of the equilibrium level of income only, at any rate in the simplest case such as we are considering here. In the more complicated cases to be dealt with later other possibilities will arise.

If the economy is at a level of income lower than  $Y_1$ ,  $C+I$  is greater than  $Y$ , i.e. total demand exceeds total supply, and total output will therefore tend to increase until the output  $Y_1$  is being

produced. Conversely, if the economy is operating at a level higher than  $Y_1$ , total supply ( $Y$ ) will exceed total demand ( $C+I$ ) and output and incomes will tend to fall until  $Y_1$  is reached. Thus, not only is  $Y_1$  an equilibrium position, but there are forces at work tending to establish it as the final outcome, if we can ignore all the dynamic problems mentioned earlier.

## (ii) THE CONCEPT OF FULL EMPLOYMENT

There are, of course, many reasons why the economy may not adjust freely and smoothly to the equilibrium position. Ignorance, miscalculation, immobility, etc., may all impede the process of adjustment, or even engender perverse reactions. There is, however, an even more important reason for us to consider here, and that is if the economy, at a lower level of output and income than  $Y_1$ , is unable to expand output to the required extent, because some or all of its productive resources are fully employed. In reality this will not be at some simple clearcut level of output, but there will rather be increasing difficulty experienced with each successive attempt to raise output, as first one factor runs short, and then another. Nevertheless, we shall assume for present purposes that some given output,  $\bar{Y}$ , is the maximum that can be attained, in the short run at least. Thus in figure 13.5, the equilibrium level of output,  $Y_1$ , is unattainable since output cannot rise above  $\bar{Y}$ . What will now happen, in the

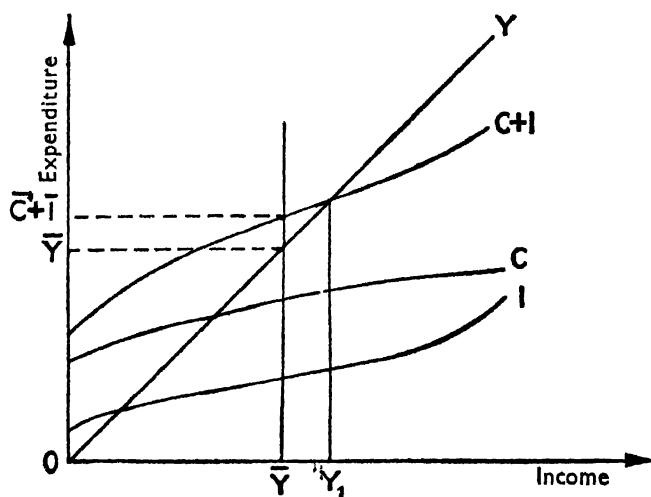


Figure 13.5

absence of Governmental intervention, is that the excess demand at  $\bar{Y}$  (i.e. the amount by which  $\bar{C} + \bar{I}$  exceeds  $\bar{Y}$ ) will force prices up. If this rise in the general price level is not accompanied by simultaneous increases in general purchasing power, then the real amount of consumption and investment will be reduced. If the diagrams are interpreted as measuring demand at fixed prices, then when prices go up, quantities demanded will fall, and in terms of the former prices demand will

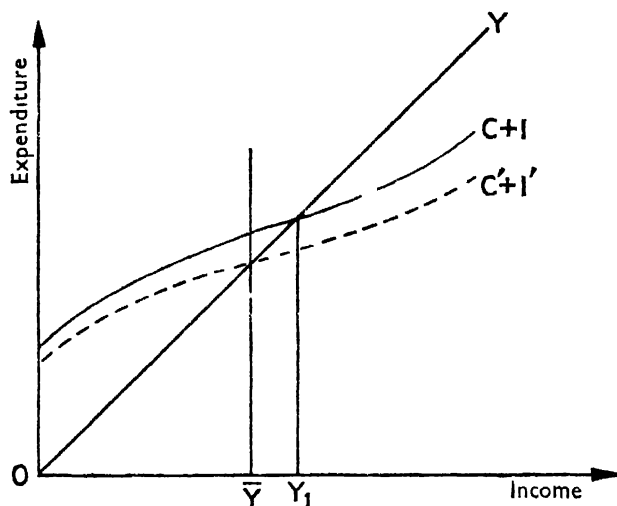


Figure 13.6

have been reduced, say from  $C + I$  to  $C' + I'$  in figure 13.6, so that in real terms supply and demand are once more equal, though at a higher general level of prices. However, such increases in the general price level are very likely to be accompanied, or followed almost immediately, by a rise in money purchasing power, so that the 'inflationary gap' is opened up again. This all-too familiar aspect of the problem will not be pursued further here, because it cannot adequately be treated in the sort of analytical framework we are using. Moreover, the role of the credit and monetary authorities is crucial in this connection, and that lies outside the scope of this book.

Conversely, the equilibrium level of output  $Y_1$  may be below the full employment level  $\bar{Y}$ , as in figure 13.7. In this case the equilibrium level of income and output will certainly be attainable, but it will not be particularly desirable, since it implies a level of utilization of

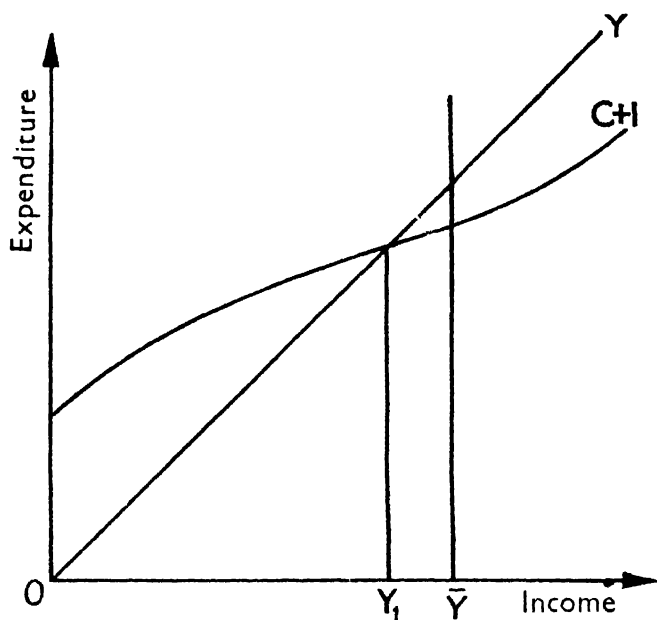


Figure 13.7

resources that is less than the maximum of which the economy is capable. Here Governmental intervention will be required, not to deal with the inflation, but to deal with the depression (i.e. resources lying idle which their owners would like to see being used).

### (iii) FOREIGN TRADE

It is only possible to introduce foreign trade in a rather cursory way into this type of analysis, for imports and exports, more than most elements in the economy, are subject to a vast range of outside influences that require a much more complex analytical system than there is room for here. All that will be done therefore is to introduce them in a rather arbitrary way, so as to illustrate their role under one particular hypothesis about their relationship to the level of national income. The hypothesis in question is that depicted in figure 13.8. Here the foreign demand for exports (the *X*-line) is assumed to rise steadily, but only slowly, as income increases, while the home demand for imports (the *M*-line) is assumed to remain low, though rising slowly, until the economy approaches full employment, when it

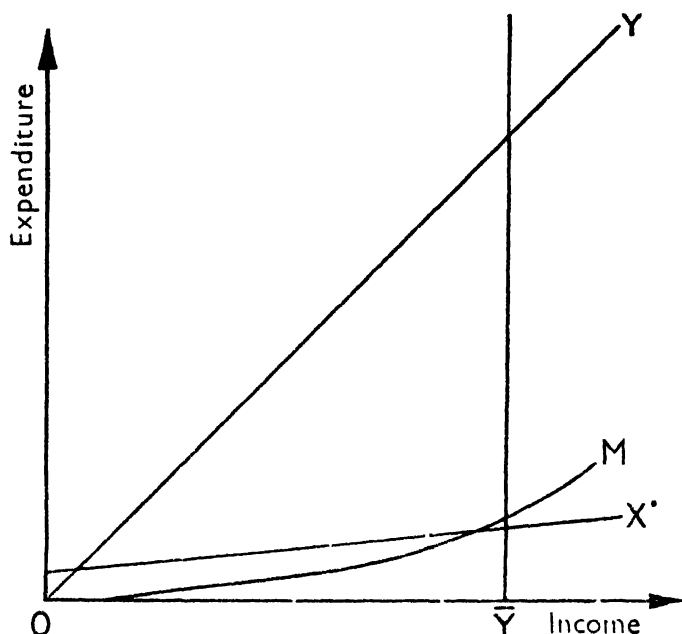


Figure 13.8

begins to rise much more sharply. At low levels of national income the balance of foreign trade is 'favourable' (i.e. exports exceed imports), while as full employment approaches it turns 'unfavourable' (i.e. imports exceed exports) and becomes increasingly more unfavourable the higher the level of national income gets. It must again be stressed that this hypothesis is adopted here simply because it is an interesting one for expository purposes, and not because others are considered intrinsically less worthy of consideration.

Total demand will now be  $C + I + X$  (see figure 13.9), while total supply will be  $Y + M$ , so that the new equilibrium position will be  $Y_1$ , where  $C + I + X = Y + M$ . At this level of income,  $I$  does not necessarily equal  $S$ , as it did before, but if it does then  $M$  will equal  $X$ . Alternatively, if  $I$  is greater than  $S$ ,  $M$  will be greater than  $X$  by the same amount, while if  $S$  is greater than  $I$  (as in figure 13.9),  $X$  will be greater than  $M$  by the same amount.  $M$  equal to  $X$  means equilibrium on the current balance of payments,  $M$  greater than  $X$  means a deficit, and  $X$  greater than  $M$  a surplus.

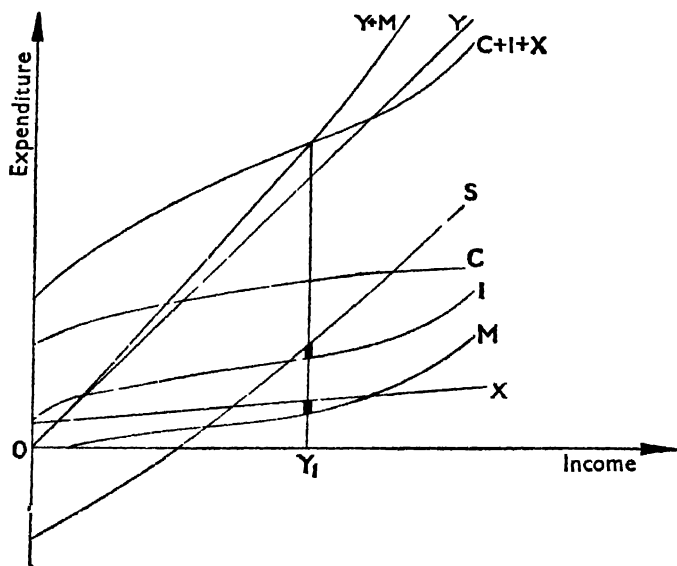


Figure 13.9

## (B) BUDGETARY MEASURES

### (i) TAXES

From the earlier analysis we have seen that through taxation the Government can influence the levels of consumption, of saving, and of investment, and also the supply of factors in a variety of ways. The direct effect of taxation upon the levels of exports and imports has not been dealt with explicitly up to now, but the earlier analysis can easily be adapted to this purpose. Tariffs, customs duties, etc., can be regarded as business taxes on goods originating from abroad, and export duties (or subsidies) as a special tax (or subsidy) on certain final products sold in particular markets, to which the analysis of Chapter VIII is clearly relevant.

In figure 13.10, the imposition of a simple proportional tax on income will shift purchasing power to the Government (to the extent shown by the line  $T_1$ ), and will shift private disposable income from  $Y$  to  $Y - T_1$ . Consumption and saving decisions will then be made on the basis of disposable income after tax ( $Y - T_1$ ), so that the  $C$ -line will be shifted downwards, say to  $C_1$  in figure 13.10, and the  $S$ -line to  $S_1$ . The important thing to note here is that consumption does not

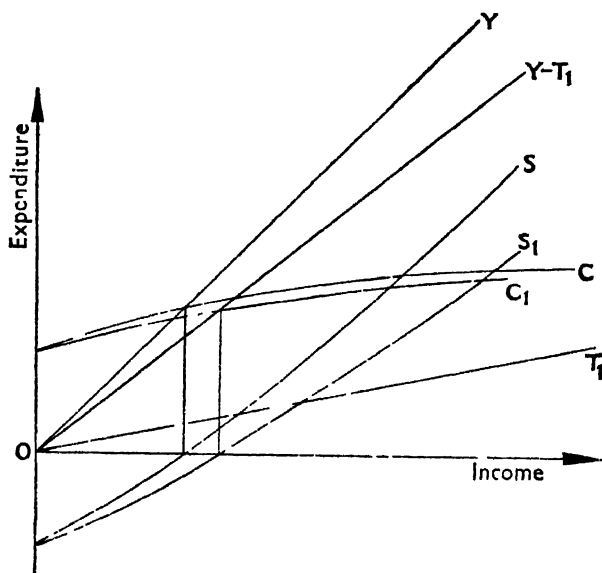


Figure 13.10

fall by the full amount of the tax, because part of the adjustment falls on saving.

Similarly a business tax which increases the prices of all consumption goods uniformly, will shift the real consumption line proportionally downwards (to  $C_1$  in figure 13.11) and may lead to a diminution in saving (from  $S$  to  $S_1$ ) as well. In this instance the tax yield ( $T_1$ ) has to be added to real consumption (i.e. net consumption expenditure)  $C_1$ , in order to get gross consumers' expenditure ( $C_1 + T_1$ ), which together with saving ( $S_1$ ) exhausts income ( $Y$ ).

We know from the earlier analysis that taxes can have many other effects besides these. By affecting business profitability they may influence investment. They may also influence investment by changing the relative prices of labour and capital equipment in particular processes. Such influences will be allowed for here quite simply by introducing an appropriate shift in the  $I$ -line in response to the tax measure. Similarly, taxes will be allowed to influence imports (the  $M$ -line) and exports (the  $X$ -line) in an equally arbitrary manner wherever such shifts are appropriate.

Finally, taxes may affect factor supplies, and in this way affect the level of output at which 'full employment' is attained. It may happen, for instance, that the imposition of an income tax leads to an increase

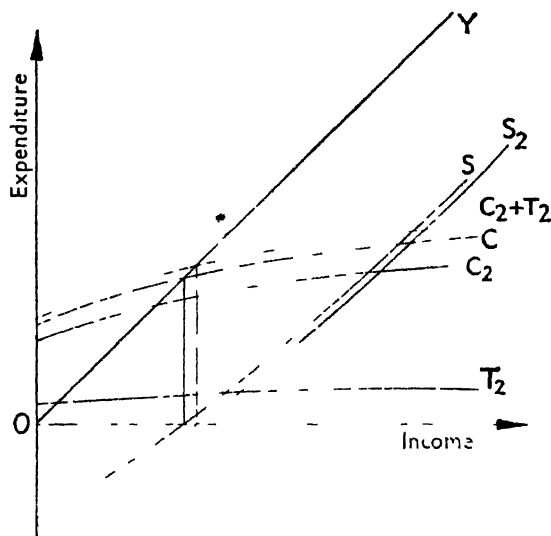


Figure 13.11

in the supply of labour, thereby raising the level of full-employment output ( $\bar{Y}$ ) if shortage of labour was a limiting factor. On the other hand, a tax on business profits might reduce the level of investment and lead to a shortage of capital equipment which became a major bottleneck holding up the expansion of output beyond a certain level. Other examples could easily be given, but since their effect, within the present context, is simply to make taxes influence the position of  $\bar{Y}$  in one way or another, they will not be pursued further, since such adjustments can easily be incorporated into the analysis if this is desired. In what follows we shall not make any such adjustments, however, but simply ignore this aspect of the problem.

## (ii) GOVERNMENT EXPENDITURE

It is important here to distinguish between transfers and subsidies on the one hand, and Governmental demand for goods and services on the other. Government expenditure on transfers simply augments private disposable incomes without competing directly for real resources. Such transfers are essentially negative taxes.

Again, many alternative hypotheses could be tried as to the relationship between such transfers and the level of national income. Here we shall assume that such transfers are high at very low levels of national income (since they would then comprise mainly un-



employment benefits and other forms of public assistance to the needy when incomes in general are depressed), they fall off quickly as national income rises, until they finally even out (as public assistance to the needy in general falls off, and long term commitments, such as old age pensions, assume major quantitative importance in

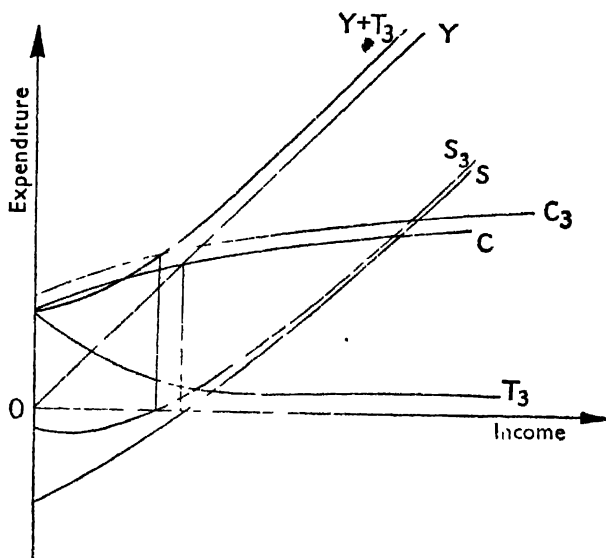


Figure 13.12

the total). This relationship is shown by  $T_3$  in figure 13.12, where total disposable income becomes  $Y - T_3$ , so that both consumption and saving will rise (from  $C$  to  $C_3$  and from  $S$  to  $S_3$  respectively). It will be seen that these reactions are exactly comparable to those shown earlier in figure 13.10, except that all the adjustments are now in the opposite direction. Henceforth, transfers will be lumped in with taxes, as an offsetting item, and only the net balance shown as the  $T$ -line, which will generally be assumed such that taxes outweigh subsidies and transfers.

Governmental demands for goods and services, on the other hand, will be shown separately in subsequent diagrams, although no distinction will be drawn between the current (consumption) demands of the Government, and its capital (investment) demand. In figure 13.13 it is assumed that governmental demand for goods and services (the  $G$ -line) is quite independent of current levels of income. Again,

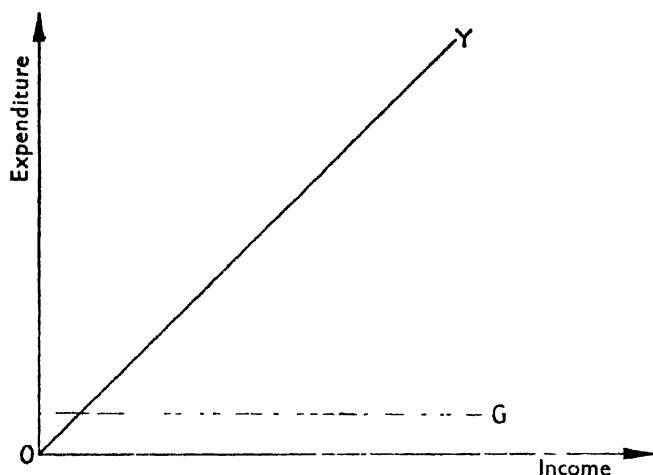


Figure 13.13

other hypotheses can, and should, be substituted for this depending on the situation being analysed, but this will suffice for present purposes.

### (C) STABILIZATION AT FULL EMPLOYMENT

We can now see how budgetary measures may be used to achieve stabilization of the economy at full employment. The use of direct taxes on persons, of business taxes, and of Government expenditure on goods and services, will be considered in turn, first of all without the foreign trade complications, and subsequently taking account of them.

#### (i) DIRECT TAXES ON PERSONS

The first case to be dealt with is depicted in figure 13.14, and is one where the equilibrium level of income ( $Y_1$ ) is at less than full employment ( $\bar{Y}$ ). The policy objective is therefore to boost total demand by using direct taxes on persons. The yield from these taxes has not been shown explicitly as a  $T$ -line in figure 13.14, but they have nevertheless been deducted from total disposable income ( $Y$ ) to give the net disposable income after tax ( $Y-T$ ), so that the  $T$ -line could easily be reconstructed as the vertical distance between these two. What has then to be done is to reduce personal direct taxes (or increase personal direct subsidies) by an amount sufficient to

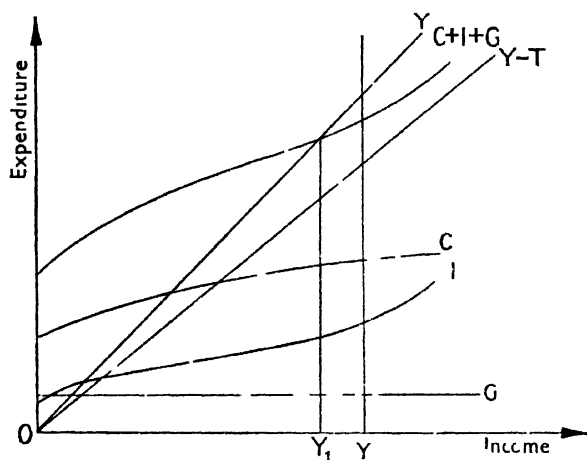


Figure 13.14

raise the  $C$ -line so that total demand (consumption plus investment plus Government expenditure on goods and services) is equal to total supply at full employment ( $\bar{Y}$ ). The amount by which  $T$  has to be reduced (i.e.  $Y-T$  has to be increased) to achieve this desired

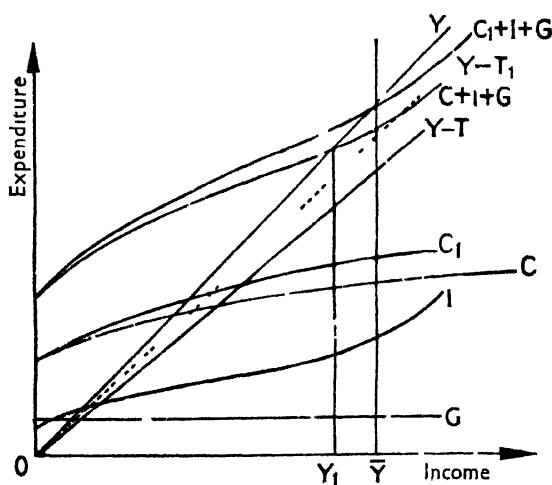


Figure 13.15

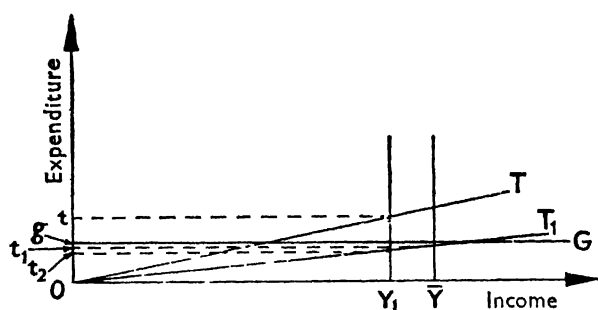


Figure 13.16

increase in  $C$ , depends on the proportion of the tax rebate that will be spent on consumption. The smaller the amount that will be saved, the smaller will be the rebate required. In figure 13.15 one possible such adjustment is indicated, with taxes reduced (or transfers increased) from  $T$  to  $T_1$ , so that net disposable incomes increase from  $Y - T$  to  $Y - T_1$ , and consumption consequently increases from  $C$  to  $C_1$  (with saving also increasing, though this is not shown in the diagram). The new level of total demand is shown as  $C_1 + I + G$ , which intersects the  $Y$ -line at  $\bar{Y}$ , as required.

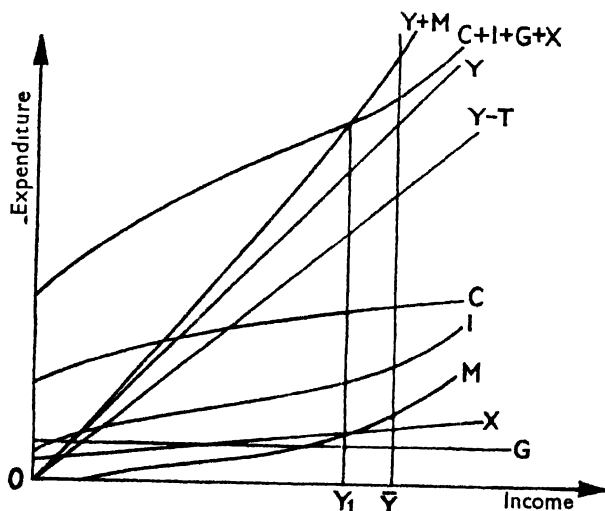


Figure 13.17

Figure 13.16 abstracts the budgetary elements from this situation. It will be noted that the tax remissions (or increased transfer payments) change the budget surplus ( $gt$ ) at  $Y_1$  into a budget deficit ( $gt_1$ ) at  $\bar{Y}$ . However, this deficit is not as large as one would have expected if the budget outcome with the new measures had been estimated on the basis of  $Y_1$  incomes, for there it would have been  $gt_2$ . The reason for this is that the tax remissions, in boosting the general level of activity, also increases the tax base, and hence the yield of the remaining taxes, so that the fall in tax revenues is less than proportionate to the fall in the rates of tax. Note too that in both of these equilibrium situations the budget is unbalanced, in the former situation because  $I$  was greater than  $S$ , and in the latter case because  $S$  was greater than  $I$ , so that the Government is first acting like a net saver and then like a net dissaver in order to maintain the balance.

If foreign trade is now introduced into the picture, we are confronted with a more difficult problem as shown in figure 13.17. The demand for imports will probably be affected somewhat by the reduced personal direct taxes, just as is the consumption of home produced goods, but it would be the greatest coincidence if the

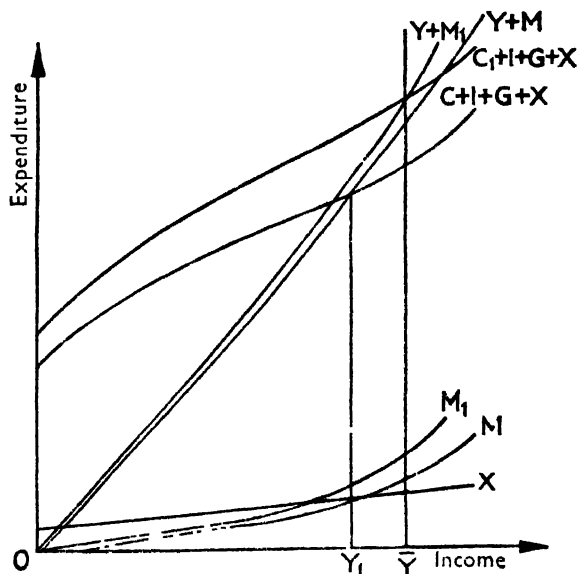


Figure 13.18

general measures required to make total demand ( $C+I+G+X$  in figure 13.17) equal to total supply ( $Y+M$ ) at full employment, also happened to bring the balance of payments into equilibrium (i.e. make  $M$  equal to  $X$ ) at this same level of income. Figure 13.18 shows a situation where overall equilibrium has been established at full employment ( $C_1+I+G+X$  equals  $Y+M_1$  at  $\bar{Y}$ ) but where the balance of payments is in deficit ( $M_1$  is greater than  $X$ ). The Government is then in something of a dilemma. It has three broad courses of action open to it: (1) it can abandon full employment in favour

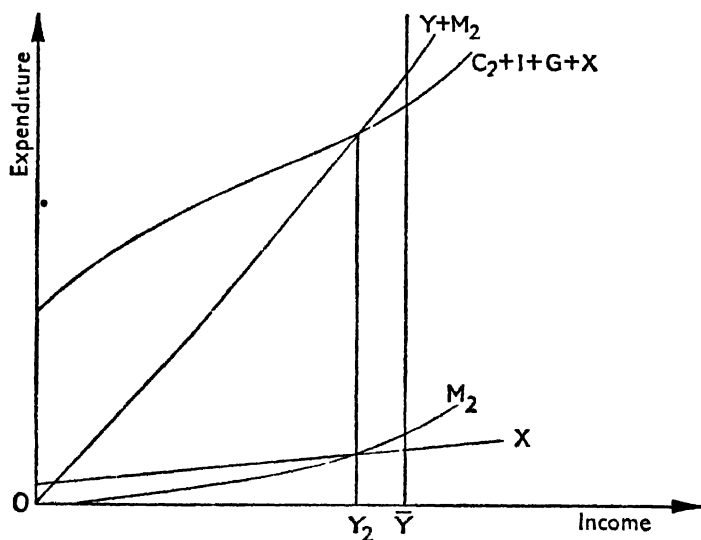


Figure 13.19

of balance of payments equilibrium; or (2) it can abandon balance of payments equilibrium in favour of full employment; or (3) it can adopt additional measures to try to solve the balance of payments problem while still maintaining full employment. Policy (1) may mean restricting both imports and consumption of home-produced goods by raising personal direct taxes by an amount sufficient to establish a position such as that shown in figure 13.19, where an equilibrium level of income  $Y_2$  has been established at which the balance of payments is also in equilibrium, but which is below the level of full employment output ( $\bar{Y}$ ). Policy (2) means resting content at the position shown in figure 13.18, the snag about this being that some way

has to be found of financing the balance of payments deficit. Policy (3) means using, say, import duties to reduce imports, while at the same time adjusting total demand by further changes in personal direct taxation, so as to achieve the outcome shown in figure 13.20. One danger in this situation is that the reduction of imports in this way may induce retaliation by the countries affected, thus reducing exports ( $X$ ) and re-opening the deficit. Another problem is that imported materials may form an important element in determining the full employment level of output, and there may therefore be repercussions there too.

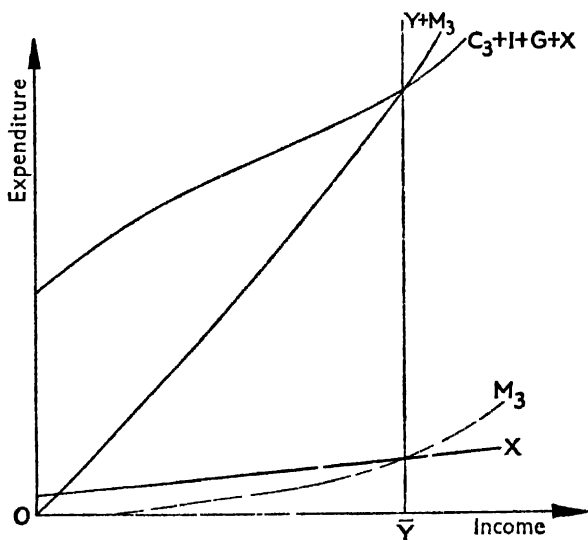


Figure 13.20

No attempt will be made here to deal with the opposite case, where there is incipient inflation because the equilibrium level of income is higher than the full employment level. The same kind of analysis as that just conducted for the other case could be applied to the inflationary situation, for the same considerations apply, though in reverse.

## (ii) BUSINESS TAXES

It will be assumed here that the imposition of business taxes reduces both consumption (in real terms, though it may increase gross money outlays through higher prices) and investment (also in real terms).

This time we will analyse a case where there is initially some inflationary pressure, i.e. the equilibrium level of income ( $Y_1$ ) is above the full employment level ( $\bar{Y}$ ), as in figure 13.21. In the initial situation it will be assumed that taxes and transfers were precisely off-setting each other in all respects, so that the  $T$ -line ran along the horizontal axis. The Government then imposes, say, a general sales

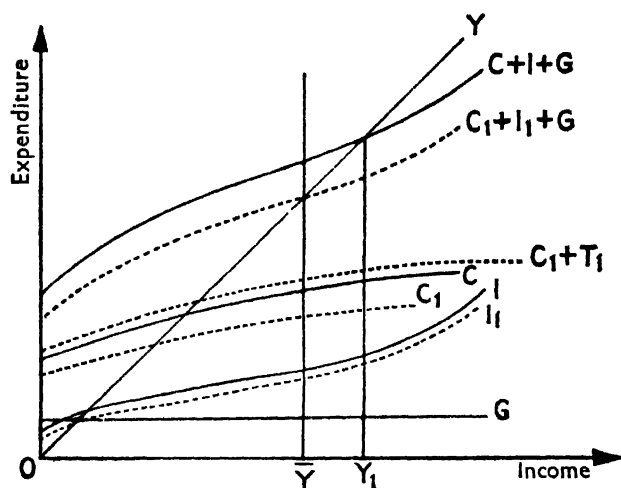


Figure 13.21

tax on all consumers' goods, so that the level of consumption expenditure in money terms is shifted upwards to  $C_1 + T_1$ , while in real terms consumption falls from  $C$  to  $C_1$ . Investment is also reduced, from  $I$  to  $I_1$ , so that the new equilibrium (where  $C_1 + I_1 + G$  equals  $Y$ ) is moved from  $Y_1$  to  $\bar{Y}$  as desired. Here the adjustment falls upon both consumption and investment whereas in the earlier cases the Government operated upon consumption only. From a purely short term stabilisation viewpoint, there is nothing to choose between the two methods, but in other respects there are important differences. For instance, quite apart from their differing impacts upon the structure of the economy, they will in the long run have a different impact upon growth, via their respective effects upon the supply of factors, and upon full employment levels of output.

When it comes to the foreign trade aspect of the situation, there is little that can be added to the comments made in the preceding section. If the business tax is levied on exported goods as well as



on those for the home market, and is also levied on imports in the same way as on domestically-produced goods, then some downward shifts in the  $M$  and  $X$  lines may also be expected without any special additional measures, but it will still be the merest coincidence if these shifts happen to produce equilibrium in the balance of payments at full employment.

### (iii) GOVERNMENT EXPENDITURE

Purchases of goods and services by the Government, as distinct from transfer payments or subsidies, are relatively simple to analyse, for they constitute a perfectly straightforward demand for real output, in competition with the demands of the private sector. Thus the depressed state of the economy illustrated in figure 13.14 could have been put right quite simply by an appropriate increase in  $G$ , and the inflationary situation illustrated in figure 13.21 could have been cured by an appropriate cut in  $G$ . There is little difficulty in increasing imports directly by Governmental purchases from abroad, should such a policy ever be considered desirable, but the Government has no such direct influence over exports.

One additional point to be noted here is that Governmental purchases of goods and services have a primary impact on total demand which is in a one-to-one relationship, whereas we saw that

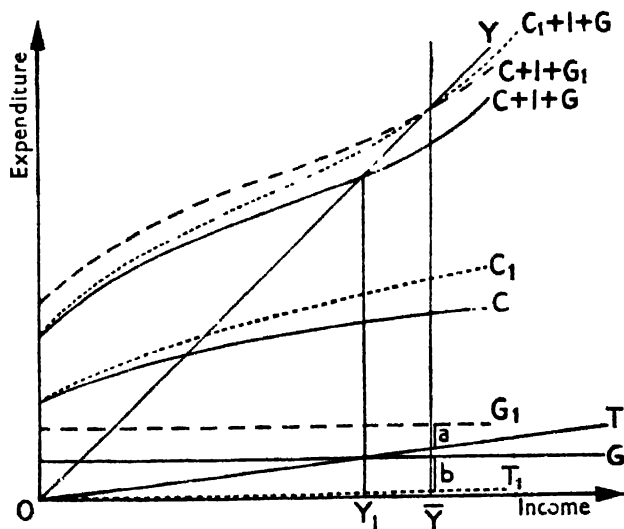


Figure 13.22

the primary impact of tax and transfer changes depended upon the marginal propensity to consume of those affected by the changes. This fact has special implications for the budget balance, as will be seen from figure 13.22, in which a situation is depicted which is similar to that in figure 13.14 earlier but with the budget now being shown in balance at the equilibrium level of income  $Y_1$ . If we now consider the two alternative broad courses of action, reducing taxes ( $T$ ) or increasing Government expenditure ( $G$ ) as means of attaining full employment ( $\bar{Y}$ ), we shall reach the following result: if  $G$  is increased (to  $G_1$ ) and  $T$  left unchanged, the budget goes into deficit by the difference between them (a) at  $\bar{Y}$  (see figure 13.22), but if instead taxes are reduced (to  $T_1$ ) and  $G$  left unchanged, and the adjustment to this tax remission is partly to increase saving, the budget deficit (b) is larger than in the preceding case. Thus the size of the budget deficit (or surplus) generated as a result of stabilization policy depends on the actual measures chosen to implement it. *There is no simple relationship between the size (or direction) of the budgetary unbalance and its net inflationary or disinflationary effect on the economy*

It would be possible, in the situation just analysed,\* to have a balanced budget if this were considered desirable. For each time that  $G$  and  $T$  are raised by the same amount, total demand increases by the difference between the increase in  $G$  and the fraction of the extra tax that is met by cutting consumption. For instance, if  $G$  and  $T$  were both raised by 100, and the extra 100 in tax resulted in a consumption cut of 80, total demand would rise by 20 (the extra 100 of  $G$  minus the fall in  $C$  by 80). Thus in figure 13.23, by increasing  $G$  to  $G_1$ , total demand is increased by  $g$ , while an increase in  $T$  to  $T_1$  (although it increases tax revenues by  $g$  at  $\bar{Y}$ ) will only decrease consumption (from  $C$  to  $C_1$ ) by  $c$  at  $\bar{Y}$ , so that the net increase at full employment is  $g - c$ , which makes the full employment level of income the equilibrium level, yet at the same time keeping the budget balanced. But to do this the volume of Governmental activity had to be increased quite substantially by comparison with the earlier case where the budget was left unbalanced. In an inflationary situation, measures to restore equilibrium at full employment with a balanced budget, would call for cuts in  $G$  and  $T$ , and if these had to be substantial, as in the previous case, then again the other implications of such drastic changes in the volume of Governmental activity would have to be weighed against the advantages of keeping the budget balanced.

One final point to be mentioned, before leaving this aspect of the

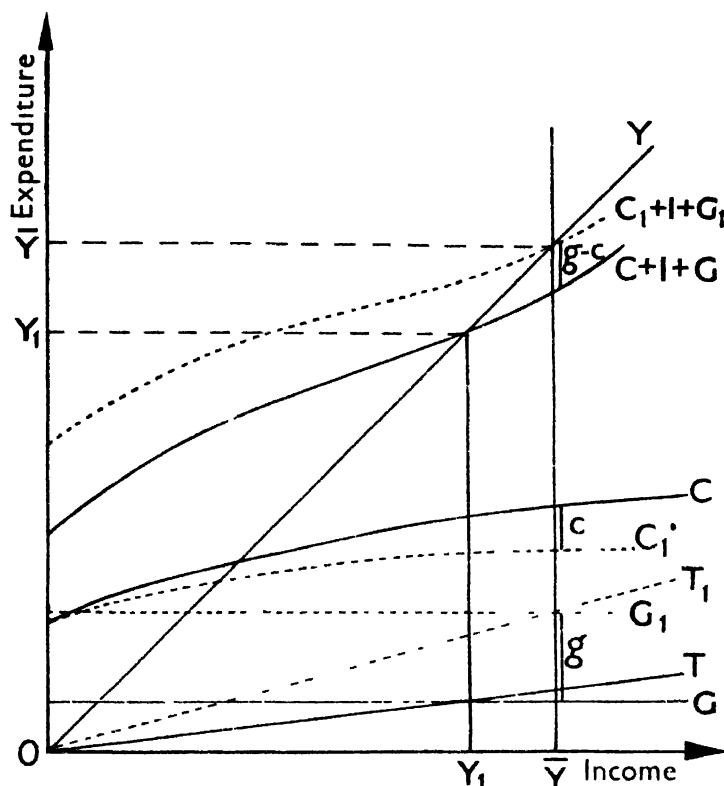


Figure 13.23

problem, concerns the relationship between the primary and ultimate effects of these tax and expenditure changes. As well as the direct increase in incomes that arises immediately from an increase in  $G$  (or from tax remissions or increases in transfer payments), further increases will follow from the induced increases in consumption, investment, etc., for these will in turn constitute increases in income to other members of the community, who will in turn increase their consumption expenditures, and so on. This 'multiplier' effect, already taken into account in the diagrammatic analysis, means that budget changes need only be a fraction of the desired change in total demand, and the larger is the 'multiplier' (i.e. the more sensitive is the level of consumption to changes in disposable income) the smaller need be the changes in taxation or expenditure to ensure any given effect.

Extension of the analysis to consideration of the foreign trade balance, and the effects of these changes on the full employment level of income itself, raises no issues that have not already been indicated.

#### (D) CONCLUDING REMARKS

The vast subject of stabilization policy has only been touched upon here, and it obviously deserves far more space than is available for it in this book. What has been attempted is a brief sketch, in the barest outline, of the nature of the problem, and the broad role to be played by budgetary measures in solving it. But budgetary measures are not the only ones in the Government's armoury, and even they have not been analysed exhaustively. Sufficient has been said, however, to indicate the relevance of the earlier micro-analysis to the choice of weapons in any particular situation. In that analysis we found that some taxes, and some tax structures, have a much greater effect on, say, consumption than others do, while the main impact of some other taxes is, perhaps, on factor supplies. Transferred to a macro-setting, these conclusions will clearly influence the choice of anti-inflationary or anti-depression measures adopted.

Moreover, the problem of stabilization is intricately bound up with the problem of growth, which is the subject of the next chapter. Much of what has been said here concerns only the short-run aspects of stabilization policy. The long term aspects are more conveniently dealt with together with the growth problem.

## CHAPTER FOURTEEN

### The Growth of the Economy

Just as it is not easy to define precisely what kind of 'stability' it is that people desire in economic life, it is not easy either to define precisely what kind of 'growth' they desire. Economic growth means the possibility of higher material living standards, but this is not just a matter of getting as much as possible to consume immediately, for it also requires the setting aside of a substantial part of current output for future use in production (i.e. capital accumulation) if the growth is to be sustained, or even for the consolidation of past growth. But there is more to it even than this. Economic wellbeing is improved not only by making more goods available, but also by ameliorating the conditions under which such goods are produced. For instance, taking more leisure (shortening working hours) may improve welfare more than increasing the amount of goods that can be bought. One cannot therefore conclude that one situation is better than another just because in the former there is a higher gross national product per head. It will depend on the relative hours and conditions of work, the composition and distribution of output, and so on. Moreover, the problem of measurement makes movements in vast aggregates like 'gross national product' difficult to interpret unambiguously, as was noted at the beginning of the previous chapter.

In spite of these acknowledged difficulties, for the purposes of this analysis we are going to take 'growth' as meaning rising real output. This does not imply that this is *the* index of economic welfare, but simply that it will be one of the components, along with stability, an appropriate composition and distribution of output, and so on.

In formal terms growth could be analysed by adopting the framework of analysis used earlier in Chapter XII, when we were concerned with the structure of the economy. Thus figure 12.13 could be re-interpreted in the following terms: let  $VV'$  be the original production possibility curve, and  $TT'$  the new one consequent upon an increase in the efficiency of the labour force due, let us assume for simplicity's sake, to the discovery of new techniques requiring no other changes in the productive apparatus of the economy. Within

this framework 'growth' becomes a series of 'outward' shifts in the production possibility curves. It is a straight-forward matter then to go on and incorporate into the analysis associated shifts in the composition of output and in the distribution of incomes, as indicated earlier.

Similarly, in terms of the analysis of stability in Chapter XIII, growth can be interpreted to mean successive increases in the full employment level of real national income. Thus, with respect to figure 13.5, we might postulate that  $\bar{Y}$  will shift to the right or to the left in subsequent periods according to the actual level of investment ( $I$ ) that is attained currently. This assumes that shortage of capital equipment is the effective limit on the expansion of real output, and that  $I$  has to reach some critical level before real output can increase. If it falls short of this critical level, then the full employment level of output will in fact fall. Growth then consists of a shift to the right in  $\bar{Y}$  in each successive period (and in ensuring that the economy operates at full employment in each period).

Pursuing an analysis of growth along these lines is not entirely without profit, but the limitations of such a pursuit are so severe as to make it hardly worth while to devote any more space to spelling it out in detail here. In considering economic growth there are so many important variables that have to be neglected by such analytical methods, that the space available here would be better employed pointing out the inadequacies of our earlier treatment when it comes to growth and long-run stability.

As an instance we may take problems of timing, which have so far been entirely neglected. Not only is the time sequence of events critical to an effective budgetary policy, but a careful appraisal of time lags in adjustment will also be an essential pre-requisite, both when it comes to making a correct diagnosis and when it comes to prescribing a remedy (should one be necessary). Here it is no longer a matter of bringing about some immediate adjustment in the economy, but also of thinking about its future repercussions, about their sequence and timing, about supplementary measures that may be necessary immediately or in the future, to counteract or reinforce actual or expected tendencies, and so on. It then becomes important to know whether the reactions of the economy to any particular 'disturbance' are likely to be 'damped' (i.e. tending to diminish in magnitude through time) or 'explosive' (i.e. growing in size cumulatively) and whether oscillatory (i.e. with wave-like motion) or not. This leads one straight into the problems of 'cycles and trends' which occupy a major portion of the attention of economists these days.

These problems of dynamic stability with growth are undoubtedly of the utmost importance to economic policy in general, and to budgetary policy in particular, but unfortunately it is impossible to deal with them satisfactorily within the compass of this book. In the first place, there is a much smaller area of agreement about the way this problem should be approached than about any of the other matters that have been taken up here. Secondly, the whole subject is so complex that a cursory treatment which had the appearance of yielding precise results would probably be more misleading than enlightening. So if the matter to be presented here is less exact than that presented hitherto, it is not only because of self-imposed constraints upon the type of theoretical framework considered admissible in an expository work at this level, but also to real ignorance on the part of economists.

Consequently, we shall have to be content to set out briefly the basic factors making for economic growth, and then to indicate the possible effects of budgetary measures upon them.

### (A) THE BASES OF ECONOMIC GROWTH

Economic growth depends broadly upon two considerations, firstly the quantity and quality of the factors that are available, and secondly the efficiency with which they are utilized. Each of these will be considered in turn.

#### (1) THE AVAILABILITY OF FACTORS

At its crudest, the supply of factors means the actual quantities of the various natural resources (including human labour) that are available, but this interpretation does not carry us very far. Coal, oil, iron, tin, copper, and other mineral wealth may be deposited in the earth in what may, for our purposes, be considered fixed amounts. On the other hand, the amount of cultivable land, of timber, of fresh water, etc., depends to a large extent upon human activity (or inactivity), and so cannot be regarded as 'given' in quite such an arbitrary sense, irrespective of what is happening in the economic system. This is even more so when it comes to the supply of human labour itself, for this is clearly not just a matter of the size and structure and geographical distribution of the population. The whole social structure of the society, as well as particular elements in it, such as its educational system, will determine what types of skill are forthcoming, in what quantities, and where, and how much mobility (both occupational and geographical) there is.

The classical division of factors into three categories—'labour' (meaning all human resources), 'land' (meaning all non-human resources the supply of which is fixed), and 'capital' (meaning all non-human resources the supply of which is variable)—can be reduced to two for our purposes, since it is doubtful whether there are any resources in absolutely fixed supply in any significant economic sense (for even mineral wealth has to be 'discovered' before it can sensibly be said to be 'available').

Let us therefore consider the category 'labour' first. This means not only manual labour, but also clerical, administrative, executive, creative, imaginative, scientific and entrepreneurial activity. Indeed, human activities such as invention and innovation are probably of crucial importance in determining the pace and direction of economic growth. Thus although the size and structure of population, and its genetic attributes, are fundamental, the social aspects are also a potent influence, among which will be the kinds of attitude imbued in members of the society, its educational provisions in the widest sense (not simply technical and vocational training), its social and legal institutions regulating work and property, and so on.

When it comes to the availability of non-human resources, many of these same considerations apply. There is, basically, the discovery of such factors, and of their location, and this immediately requires the use of many of the skills just mentioned. Some of these 'skills' have then to be 'invested' in such resources before they can reasonably be said to be 'available' to the economy. This is why all non-human resources are lumped together in the category 'capital'. Beyond this primary stage it is rather an arbitrary matter to decide just where the dividing line between 'factor availability' and 'factor utilization' falls. Is coal available when the seam has been discovered, or only when the shaft has been sunk, or only when it has been brought to the surface, or does it require in addition the establishment of a transportation system to carry it to wherever it may be needed? Rather than attempt to answer such questions, let us turn to the next stage in our task, and consider these and related matters there.

## (ii) THE EFFICIENCY OF FACTOR USE

The efficiency with which factors are used depends on the state of knowledge concerning the possibilities, the way in which the economic system is organized and the effectiveness with which it works.

An obvious first requirement of efficient factor use is the continuous full and effective employment of labour, for this is a factor



which if not used currently is lost forever, it cannot be 'put aside' for later use. Thus an important part of efficient factor use is full employment of labour. But another aspect of it is to ensure a high degree of mobility of labour, both occupationally and geographically. Without such mobility the adaptability of the economy to changing circumstances will be seriously impaired. This requires that labour, though specialized, be not irrevocably specialized, that there be adequate incentives to change, and the ability to do so without too much general or individual dislocation, while at the same time avoiding wasteful 'labour turnover' of an unnecessary kind. It may well be here that a fully employed labour force may be an immobile labour force, while to secure mobility something less than full employment may have to be tolerated.

Turning to the efficient use of capital, analogous problems arise. It is clearly desirable to use existing capital equipment as fully as possible, but not at the expense of inhibiting a changeover to better techniques as these become known. The pattern of investment needs to be responsive to change in conditions, and, since much capital equipment is specialized and longlasting, mistakes can be costly in terms of real resources misallocated. Here the critical role of expectations in relation to investment decisions is obvious, and the importance of accurate information which is available promptly. Miscalculations are less likely if large and sudden adjustments can be avoided. But sometimes, for the sake of overall stability, particularly sectors (e.g. imports or private investment) have deliberately to be subjected to specific manipulation, quite apart from disturbances which may occur due to new discoveries, changed needs, or natural disasters. Paradoxically too, general stability may engender a complacency and lack of initiative which makes the economy less adaptable and hence more liable to make mistakes in the long run, through apathy or exaggerated conservatism born of a false sense of security.

But in the long run the discovery and application of new techniques may well be the controlling factor. It is not at all clear what sort of relationship exists between the economic system and imaginative fields of endeavour such as research and exploration. Clearly the economy must be willing and able to devote capital and labour to such purposes, and without any certainty of immediate returns or indeed of long-run returns, for the outcomes of such processes are highly unpredictable. It does seem generally to be the case that the more resources are devoted to such purposes the greater the chances of success, but even this does not necessarily follow.

When it comes to the propagation of new knowledge, and the application of improved techniques, economic forces play a more obvious role, but here too there are intellectual, social, political and religious constraints to be taken into account that make the process anything but straightforward.

## (B) THE INFLUENCE OF BUDGETARY MEASURES

We can now go on to sketch out the influence of budgetary measures upon the more important determinants of growth, i.e. upon the supply of labour, upon the supply of capital, and upon the efficient utilization of factors. Drawing mainly upon the results of the earlier micro-analysis of the effects of budgetary measures on the behaviour of individuals and firms, we shall indicate their implications for the growth of the economy.

### (i) UPON THE SUPPLY OF LABOUR

The most obvious budgetary measure affecting the quantity and quality of the labour supply is the direct taxation of persons. Such taxation may affect the quantity of labour supplied by any particular individual through the incentive or disincentive effects that were analysed in some detail earlier. There we found, in principle, no definite general effect one way or the other, so it is not at all clear whether the effect will be to increase or decrease the labour supply generally. When it comes to the composition of the labour force, there is little doubt that the pattern of incentive and disincentive effects will be uneven over the economy as a whole, so that discriminatory effects upon the quality of the labour supply can be expected. This discrimination may be deliberate, in the sense that special concessions are made to certain occupations or skills, or it may be incidental, in the sense that certain occupations or skills happen to benefit more (or suffer less) by provisions which are made for other purposes. As an example of the latter may be quoted the discriminatory effects on fluctuating as opposed to stable incomes of a progressive tax-rate structure without adequate provisions for averaging. Another discriminatory effect may be introduced if income from some sources (say capital gains) is treated differently from other kinds of income, or if, in the case of taxes on wealth, the valuation of assets is not uniform. If the earning of capital gains is associated with some particular activity, or with the exercise of some particular skill, then there will be an obvious discriminatory effect on the composition of the labour supply.

But the direct taxation of persons is not the only budgetary measure that influences the size and composition of the labour supply. Our earlier analysis (in Chapter IX) showed that business taxes can have incentive and disincentive effects comparable to those of personal direct taxes. Moreover, taxes on business profits have a direct influence on the rewards of 'entrepreneurs', i.e. those whose organizational and risk-bearing functions are rewarded (if at all) out of taxed profits. Their expectations of gain or loss will be directly affected by the structure of the profits tax, and here again it is not only a matter of a general incentive or disincentive effect, but also of a discriminatory effect for much the same reason as in the case of personal direct taxation. The exclusion of certain kinds of expenditure from the tax base will benefit some businessmen more than others, and some industries more than others, and these relatively favoured occupations will be in a position to offer relatively higher monetary rewards in consequence.

Turning from taxes to Government expenditures, we will first of all consider the effects of personal direct transfers. In essence, these bear a formal similarity to tax concessions, and hence may be expected to have the same sort of overall and discriminatory effects. Once more we cannot tell whether they will have a net incentive or disincentive effect (e.g. hasten or delay retirement, shorten or lengthen periods of unemployment or disability, and so on) but they are likely to have some effect. The discriminatory effects may be accentuated by the nature of the particular provisions, e.g. unemployment benefits reduce the relative unattractiveness of casual employment as opposed to a steady job.

Government expenditure on goods and services is likely to have the most potent influence of all upon the labour supply. The provision of basic environmental services, such as sanitation, water supplies, refuse collection and disposal, etc., together with housing, health services and education are all likely to exert an important influence on the size and structure of the labour force. These effects are so obvious as to require no further elaboration here.

## (ii) UPON THE SUPPLY OF CAPITAL

The supply of capital means more than saving in the financial sense. It means the setting aside of real resources from consumption for use in replenishing and adding to the productive apparatus of the economy. Capital invested in human beings is not included here, but regarded as an influence bearing upon the supply of labour.

Starting once more with the effects of personal direct taxation, it will be obvious that the effects on decisions to save or consume will be of immediate relevance here, and so will the choice between risky and safe investments. But there are also other effects that were not analysed in any great detail earlier. For instance if the tax rate is progressive, then the higher rates of tax will be paid by those with the higher incomes. These are also likely to be the people with the highest marginal propensity to save, so that there is a correspondingly greater likelihood that such a tax will be met at the expense of saving. It may be that the use to which the tax proceeds are put will engender additional saving to compensate for this, but even if this were so in aggregate, it is most unlikely that the form of the saving would be the same, so that a discriminatory effect is to be expected in any case (e.g. the new saving may be 'security-conscious' rather than 'risk-taking'). Taxes on personal wealth will also have incentive and disincentive effects upon the general level of saving, as already analysed (Chapter V). But they may also have special discriminatory effects if different types of assets are treated differently in calculating the tax base (e.g. special concessions in the valuation of agricultural land as opposed to other assets). Where taxes on personal wealth are progressive, they may also have the discriminatory effect just noted in connection with direct taxes on personal income. But in general the effects on personal saving are only the beginning of the matter, for we do not only need to know what the effects are on the resources that are set aside, but also upon the uses to which they are put, i.e. upon real investment.

Since most private real investment is made by firms, and not directly by individuals, business taxes are a more direct influence here than are taxes on persons. Taxes on profits can affect the issue in several ways, as already noted in the earlier analysis. They may reduce the volume of funds available for financing investment, they may significantly reduce the profitability of investment, and they may have discriminatory effects as between different kinds of investment, or on the timing of investment, via allowances and deductions permitted in respect of capital expenditure or depreciation. If such taxes have a discriminatory impact as between firms or industries (e.g. between large and small firms, or between one product and another) then this may well affect the overall investment pattern too. A further discriminatory element enters if some capital goods are taxed (e.g. commercial vehicles or buildings) but not others, so that the optimum pattern of factor use is different from what it would otherwise have been.

When it comes to Government expenditures, transfers to persons can be ignored, for, to the extent that they are relevant, the important points have already been made in connection with personal direct taxes. Direct transfers to firms are of more interest, especially when these are made specifically to assist capital investment (e.g. capital grants for agricultural re-equipment, or building, or irrigation or drainage). The Government may make similar grants, perhaps through local authorities, to provide housing or roads or public health facilities, the effects of which on the supply of labour we have already noted. Alternatively, the Government may invest directly in these and other projects, perhaps assuming direct control or ownership of key sectors of the economy in the process, such as transport or basic extractive or heavy industries. The impact of Governmental capital expenditure of this kind is again so obvious as to require no further discussion here.

### (iii) UPON THE EFFICIENT UTILIZATION OF PRODUCTIVE RESOURCES

Here we shall ignore that aspect of 'efficient utilization' which requires the successful implementation of a short-run stabilization policy, since that has been dealt with in an earlier chapter. Efficient resource use implies fairly rapid adjustment even though, as noted earlier, this may pose a dilemma for economic policy from too-hasty adjustments which may turn out to have been ill-advised. It is clear however that anything which seriously impedes factor mobility is likely to hinder efficient factor use, because it is better that factors *could* be transferred to other uses (even though they are not immediately required to do so) than that they *could not be* so moved even if they were required to do so.

Budgetary measures can both enhance and impede the mobility of factors. Subsidies and tax-concessions granted to certain industries to keep them going, on social-service rather than efficiency grounds, are a clear case of measures which impede adjustment. On the other hand, Government-financed schemes for retraining and re-housing displaced workers from a declining industry may be expected to improve the mobility of labour. Subsidies and concessions granted for other purposes may have incidental effects on mobility, as with housing subsidies for instance, which may reduce the geographical mobility of labour if the worker has to move from subsidized to unsubsidized (or less subsidized) accommodation. On the other hand, unemployment benefits may increase the mobility of labour by

reducing the financial risks involved in changing jobs. Similar considerations apply in the field of investment, where the tax treatment of losses has already been seen as a potent influence upon the assumption by businessmen of the risks involved in new investment.

It is sometimes argued that some taxes and subsidies have the effect of reducing 'cost-consciousness' in general among businessmen, and thereby contribute towards inefficient use of factors. This effect will depend on the motivation of businessmen. If they are anxious to make as much profit as possible, then no tax will have this alleged effect on cost-consciousness unless it is levied at a rate of 100 per cent. To the extent that problems of definition of the tax base arise as noted earlier, then some costs may be increased by the tax itself, but this is not a matter of 'cost-consciousness' in general, but a particular discriminatory effect of the tax. If businessmen are concerned to get some particular rate of return on capital employed or on turnover, then profits taxes may even enhance cost-consciousness, or, alternatively, may make production no longer worth while. The effects on cost-consciousness are, therefore, open to argument.

Finally, the growth of knowledge itself may be influenced by budgetary measures. The Government may promote private research and development by favourable tax treatment of such expenditures, especially as regards capital expenditure which may have to be written off in a very short time. The Government may make direct grants to aid research conducted by private organizations, or may sponsor such research itself. Still more directly, it may set up and operate its own research establishments. Technical advisory and experimental services may be set up or supported to propagate new knowledge and techniques, and the general educational system will play an important role too.

### (C) CONCLUSIONS

Pretty well every type of budgetary measure has some implications for the growth potential or actual growth of the economy. These are often obvious, as with most Governmental expenditures on goods and services, and only slightly less obvious with the incentive and disincentive effects of taxes and transfers. Sometimes these effects are deliberate, but often they are incidental, and may be no less important in magnitude or in qualitative significance just because they were unintended. Thus we have now added another 'policy dimension' to those by which any particular measure has to be

judged, with the added possibility that it will produce an effect which will make the choice between alternative measures more complex and confused than it was before.

## CHAPTER FIFTEEN

### The Budget and Economic Policy

The budget tends nowadays to be the focal point in the presentation and implementation of the Government's economic policy. This is a matter of convenience rather than of necessity, for in principle the annual presentation of the budget accounts could be an almost perfunctory matter, concerned entirely with technical financial accountability . . . like most shareholder's meetings. It has proved, however, to be a convenient occasion on which to embark on a wide-ranging review of the general economic situation, an opportunity on the one hand to justify the Government's past actions and to persuade people of the appropriateness of any measures that may be proposed for the future, or on the other hand to attack and criticise the Government's handling of the situation. It is also often used as a means of publicising the Government's wishes regarding the behaviour of particular sectors, individuals or firms in the economy, either as an attempt to improve the chances of success of the actual measures proposed, or at times as a substitute for any such measures. Perhaps on such occasions exhortation, persuasion and intimidation of this sort should also be considered as 'budgetary measures'! In some countries the Government has not only to attempt to ensure the co-operation of the various economic units in carrying out its policy, but before its proposed measures can be put into effect, it has a real task in persuading the legislature to adopt them. In other countries legislative action is virtually assured in advance by the fact that the Government could not have been formed in the first place without such a guarantee.

But whatever the actual pattern of the budgetary process, there are usually some 'budgetary measures' that are adopted outside the formal framework of the budget itself. Governments usually have some scope for discretionary executive action outside the formal annual budget, and it would place an undue strain on the conduct of economic policy if the Government were restricted to annual adjustments at the time of the budget. There is no reason to expect the economy to be so well-behaved that an 'annual check-up' is all that is necessary to ensure the continuous fulfilment of the multi-



farious objectives of economic policy. A continuous watch needs to be kept, and frequent small adjustments may well be needed to avoid the onset of major crises. Where these small adjustments take the form of budgetary measures, they are sometimes incorporated into 'supplementary budgets' in order to observe legal or constitutional proprieties, but from our viewpoint it is immaterial whether this is done or not, for in the context of this analysis budgetary measures include any adjustments which operate directly through the budget accounts, even though they be adopted outside the formal framework of the annual or supplementary budget statement.

The pervasiveness of the modern budget is commonly remarked upon, but in a sense it is really nothing new, for the budget has always had widespread ramifications throughout the economy. The essential differences between earlier budgets and recent ones are, firstly, that nowadays budgetary policy is conducted much more deliberately (though not necessarily any more effectively) with its pervasiveness in mind, and, secondly, the size of the budget in relation to the rest of the economy has grown so enormously that the power of the budget to affect the rest of the economy has been greatly enhanced.

The important point that emerges from the foregoing analysis is that in a modern, highly integrated, sensitive and closely interdependent economic system, the effects of any particular measure cannot be easily identified, and still less can they be 'sealed off' within a particular sector or confined to a particular variable. The immediate impact of the measure may be directed to some particular segment of the economy, but it will not be possible to guarantee that it *will* have the desired effect there, nor that it will have *no other* effects there, nor yet that it will not also have effects *elsewhere*. And when it comes to tracing out the subsequent pattern of reactions after the initial impact has been absorbed, the uncertainties multiply quite, disconcertingly.

This can be illustrated most clearly by sketching out a brief analysis of the effects of a tax on a particular commodity. It is commonly assumed that the immediate effect of such a tax is to raise the price of the taxed commodity by the amount of the tax, and attention is then directed to the price-elasticity of demand for the taxed product to discover the extent to which the quantity demanded will change as a result of this price increase. This computation having been made, it is a simple matter to work out the expected tax yield, and this reduction in total purchasing power is what is usually taken as the indicator of the disinflationary effect of the tax, i.e. the extent

to which effective demand has been reduced. Sometimes reference will also be made to some possible production shifts, especially if the fall in demand is severe enough to cause significant local unemployment, but more frequently this aspect of the adjustment problem is ignored, or dismissed as being a rather distant, long-run repercussion which we can worry about (if at all) when the time comes. Those who are concerned with problems of equity and social justice will then turn to the estimation of the incidence of the tax between different groups in the community, and to this end will calculate what proportion of the extra tax revenue will be derived from the purchases of these respective groups, and this will be taken to be the incidence of the tax.

For the sake of argument, let us assume that the tax was imposed on clothing, with the dual purpose of having a general disinflationary effect and of ensuring that 'the burden of the tax' falls rather more heavily on 'the rich' than on 'the poor' (the rich being assumed to spend proportionately more of their incomes on clothing than do the poor, and also to have a lower price-elasticity of demand for clothing than the poor have). We may now ask (a) whether these desired effects will follow, and (b) what 'side-effects' may also be expected.

In the first place, we have seen that it is quite conceivable that the price of clothing will in fact rise by less than the amount of tax (see Chapter VIII), part of the 'incidence' of the tax falling on the incomes of those providing the productive resources with which clothing is made. Once this possibility is admitted, a whole new range of incidence patterns is opened up which undermines the basis of the incidence calculation as just outlined, for we now have effects on relative real incomes that are independent of the individual's purchases of the taxed commodity. The assumption that the immediate payer of the tax revenue is the bearer (and the sole bearer) of the 'tax burden' excludes consideration of the incidence effects that operate on people as producers rather than as consumers.

In the second place, even if the tax *did* result in an increase in the price of the product by the full amount of the tax, the foregoing influence would still be at work if demand for the taxed product fell. In this situation, less of it would be produced, so that less factors would be used in its production, and consequently somebody's income would be reduced. Alternatively, if demand for the taxed commodity were totally inelastic in the face of the price increase, then the incidence calculation depends on where the extra purchasing power came from. If purchases of the taxed commodity were main-

tained by cutting down other purchases, then the foregoing considerations apply to these other goods, and an incidence computation based on the source of tax revenues will be even more misleading. But in all events the production shifts (analysed in Chapter XII) will have to be taken into account.

Consumption may be maintained by drawing on savings. Leaving aside any impact of the reduction in savings itself, this implies that the tax yield can no longer be supposed to be matched by a corresponding reduction in current aggregate demand, and hence it is not a reliable indicator of the net disinflationary impact of the tax.

Fourthly, the tax may have incentive or disincentive effects (see Chapter IX) and this opens up a fresh realm of repercussions all of which have implications both for the 'incidence' of the tax and for its general disinflationary effects.

So one could go on, into some of the more refined discriminatory effects mentioned earlier, and into the implications of the whole analysis for long-run growth, but enough has been said already to indicate the impossibility of isolating the effects of budgetary measures within particular compartments. Nevertheless, as has been mentioned earlier, it may turn out that a careful assessment of some actual situation will enable one to neglect certain reactions in practice as being of a 'second order of smalls', but to neglect certain reactions without any such preliminary investigation is a very dangerous proceeding. There is not even any guarantee that proximate reactions will prove quantitatively more important than less proximate ones, nor that the direction of adjustment will be the same in both cases.

The general approach outlined here also brings out the dangers inherent in resting content with the very superficial knowledge of the impact of the budget which is to be gained by studying flow diagrams of the type presented in Chapter I. They provide about as much information concerning the influence of the budget upon the economy as would a photograph of a man about the working of the human body. One sees where the various parts are joined together, and what their relative shapes and sizes are, and that is about all. No information is given which will indicate how movement and growth take place, what are its potentialities, how it reacts to various stimuli, and so on.

Another important implication of our analysis of the multifarious effects of any particular budgetary measure upon the economy is, in a sense, a corollary of the proposition that it is impossible to isolate such effects within particular compartments. If it is true that each measure affects every variable to some extent, then it follows

that each individual policy aim can be achieved by a variety of means. Each such measure or group of measures will, however, have different implications for the other, co-ordinate, objectives of policy, and a clearcut choice between them will seldom be possible, for it will not normally be the case that one alternative is superior to all others in all respects. Often the economic analyst will be forced to point out that it is not possible to attain one objective without making the attainment of some other objective more difficult. The policy-makers will then have to determine priorities and choose accordingly. Determining the criteria of choice is not a task for economists as such, their task is to make clear the objective basis on which the choice has to be made, and the economic implications of each possible course of action if it were chosen. It should by now be clear that this is in itself a challenging assignment, for the choices that have to be made in the field of budgetary policy are as difficult as any that Governments are likely to be confronted with in any sphere of their operations.

It must be admitted, however, that by putting the whole weight of economic policy implementation upon budgetary measures, the problem has in some respects been made to look more difficult than it really is. Obviously, if manipulation of the monetary and credit systems is allowed to play a part, and direct intervention in the economy (in the form of price controls, wage-setting, quotas, etc.) is also employed, then the policy problem in general becomes more tractable because of the wider range of measures that is available. The greater the variety of weapons that can be brought to bear, the greater the chances of attaining some desired end without undesired side-effects. But adding to the armoury does, of course, also add to the complexity of the analysis that is required to elucidate and compare the relative effects of the alternatives under consideration, and there are many matters that we have been able to ignore or dismiss in the foregoing analysis, that could not be so lightly set aside if these other arms of economic policy had been under scrutiny. Indeed, a careful reconsideration of the position arrived at here would, I think, lead to the conclusion that on balance the problems of economic policy are in fact *more* difficult than they are represented as being here, and that our concentration on budgetary measures has if anything had a simplifying effect, rather than the reverse.

Finally a few comments are called for on the relationship between the approach adopted here towards the problems of budgetary policy and the more factual approach which concentrates on particular controversial issues in current policy-making. The disadvantage about

this latter 'case-study' approach is that it provides no secure basis for generalization from the particular instance that has been investigated. The disadvantage about the general theoretical approach adopted in this book is that by itself it is incapable of solving any real life problems at all. It is in fact an exercise in logic. But it (or something like it) is an essential pre-requisite for any purposeful empirical investigation, even of the individual case-study type. Fact-finding is a purely random activity unless the investigators have some meaningful questions to which they seek answers, and a conceptual framework within which any data they collect can be appraised. The type of data that is sought should be such that it will enable the investigations to establish which of the alternative outcomes (all of which are possible *a priori*) is the most likely in any particular situation. A careful analysis of a variety of such findings may even lead to a more generalized determination of the strengths of the various influences at work in different situations, so that predictions can be made about situations which have not been investigated in very great detail. No amount of theoretical analysis can replace empirical observations of this kind . . . and no fact-finding is of much use unless it is based on a firm theoretical analysis to which the data can be related.

It should not need re-iterating that the technical-theoretical approach to the problems of public finance and budgetary policy as presented here is but a first step in this task. But even if the further steps are not attempted, something has still been gained, for even the limited achievement of mastering the technical apparatus of economic analysis in this field, and still more of appreciating its limitations, is of no little importance. A wider appreciation of the strengths and weaknesses of economic analysis will enable the assertions of economists to be appraised more sensibly, avoiding both unjustified scepticism on the one hand, and, on the other, a naive confidence in their oracular powers.

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